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MOBILITY AND STUDENT ACHIEVEMENT IN TEXAS: A MULTIYEAR, STATEWIDE INVESTIGATION

A Dissertation

Presented to

The Faculty of the Department of Educational Leadership

Sam Houston State University

In Partial Fulfillment

of the Requirements for the Degree of

Doctor of Education

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by

Benjamin Mark Bostick

August, 2016

MOBILITY AND STUDENT ACHIEVEMENT IN TEXAS: A MULTIYEAR, STATEWIDE INVESTIGATION

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DEDICATION

Any strength, wisdom, or persistence that I have possessed to complete this endeavor I know has been granted to be by God. As this has been his blessing to me, I know that I must use it for the betterment of others. As such, this dissertation is dedicated to the students who can only hope that their next teacher is kind, welcoming, and dedicated even though the student knows their stay with the teacher may not be long. Also, to those teachers whose hearts break every time a student leaves their classroom knowing that the student may not find the welcome they left.

I also dedicate this dissertation to my wife, Charity, whose patience and assistance through this process has made this product possible. To my mother, from whom I learned what it looked like to be a student of higher education; through all night writing and still never missing an event for any of her four children. To my father, who all I have ever wanted to be is more like him. My father's example has always taught me that true worth is not measured by how much you have on a balance sheet, formal education, or title; but how you treat others. All of these individuals have also shown me that educators as mentioned above exist.

Finally, I dedicate this dissertation to my child who I will not meet until December. I thank him/her for being patient in coming into this world. Know that everything I have done and will do is to make the world a better place for my children, and to give them a greater platform from which to chase their dreams just as my parents and grandparents did for me.

ABSTRACT

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Purpose

The first purpose of this journal-ready dissertation was to investigate the relationship of mobility to student achievement in Grade 6 students when controlling for economic status and not controlling for economic status. The second purpose was to examine the relationship of mobility to Grade 7 students' academic achievement when controlling for and not controlling for economic status. Finally, the third purpose was to examine the relationship of mobility to the academic achievement of Grade 8 students when controlling for and not controlling for economic achievement.

Method

A non-experimental research design was used in this study. Participants were selected from the Texas Education Agency Public Education Information Management System. This database is publicly accessible and contains archival data about students' enrollment, demographic, and testing history. Archival data were obtained for the 2002-2003, 2003-2004, 2004-2005, 2005-2006, 2006-2007, and 2007-2008 school years for Grade 6, 7, and 8 students in an accountability subset for a campus or district. Raw scores from the Texas Assessment of Knowledge and Skills Reading, Mathematics, Science, and Writing tests were analyzed to determine if mobility, as measured by a student being enrolled at a campus less than 83% of the school year, had an effect on academic achievement, and if that effect persisted when controlling for economic status.

Findings

Results were consistent across all three grade levels and all subject areas. Statistically significant results were present for all analyses when controlling for and not controlling for economic status. Effect sizes for the relationship between economic status and academic achievement were large. Effect sizes for the relationship between mobility and academic achievement were trivial when controlling for and not controlling for economic status. Average scores for mobile students were between 1.93 and 3.69 points lower than the average scores of non-mobile students in reading; 2.57 and 5.63 points lower than the average scores of non-mobile students in mathematics; 1.66 and 2.42 points lower than the average scores of non-mobile students in writing; and 4.65 to 5.02 points lower than the average scores of non-mobile students in science. As such, results were congruent with the extant literature.

KEY WORDS: Mobility, Economic status, Academic achievement, Texas, Grades 6, 7, and 8

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While I will receive the doctorate that this dissertation culminates, it would not have been possible without help, guidance, and support from countless others. As it is not acceptable for the acknowledgements to be longer than the dissertation itself, I will not be able to list them all. I hope everyone who has contributed to my life knows, whether they be listed individually or included in a group, I am the conglomeration of the events and relationships in my life and all of their contributions are appreciated.

I must first acknowledge my sister, Brandi, for being my first editor, without whom I would not have been nearly as successful in any of my prior schooling (possibly not successful at all). She made my ideas comprehensible to others. I know deciphering my writing has never been a small feat, be it for my poor handwriting or poor use of the English language. I would also like to acknowledge my younger siblings, Brittany and Blake. Through them I saw the importance of the example I set. I know I have not always been a perfect example of what to do or be but know that I have always loved them and hope to be the best big brother I can be. I must also acknowledge my extended family, we all always believed we could do anything with the support of our many aunts, uncles and cousins; this dissertation is proof that we can. I must also acknowledge the Draper family, who have accepted me as their own; and Dr. Ralph Draper who has always given sound advice and been a great example of what a school administrator can and should be through hard work and adherence to solid values.

I would also like to acknowledge everyone who I grew up with and around in Frankston ISD and First Baptist Church of Frankston; teachers, administrators, and supporters their guidance and example has shaped the man I am today. Of these influential people I can never say enough about my many dedicated friends who have been by my side through accomplishment and trouble. Some of them shouldered blame that allowed me to be where I am today. Most notably I must include my best friend Dr. Seth Brown, for giving me a standard to chase. While I will never let him outdo me, it is fully out of respect and I am forever grateful for the bar that he set.

To all the educators I have worked with during my time at Stovall, Wells, and Dueitt Middle who have shown me that educators of the caliber it takes to teach students in the most difficult situations are not as rare as some think. Among them, Gerald Points, without whose technical support this data set would not have been able to have been deciphered. These educators' comradery exemplify one man sharpening another.

As the acceptance of this dissertation will lead to my third graduation from Sam Houston State University, I would like to acknowledge the University that has been such an influential part of a large portion of my life. Including my first professors in the Agriculture Department, Dr. Roger Ullrich's words of wisdom first made me believe that this degree was within my reach. Vice President Frank Parker, who I first met as Dean of Students, has always been an example for me of how to take an interest in students as an administrator and build a better system by asking "why not". Dr. Mack Hines, my first dissertation committee chair, Dr. Timothy Jones my second dissertation committee chair, my dissertation committee members Dr. Cynthia Martinez-Garcia, and Dr. George Moore have all played their part in guiding me to the culmination of this doctorate. However, no other individual has had more influence on this project through input, inspiration, or instigation than my third dissertation committee chair Dr. John R. Slate, who has been both chair and committee member. The value of his belief in me and this project should not be understated.

TABLE OF CONTENTS

LIST OF TABLES

TABLE **Page**

CHAPTER I

INTRODUCTION

Researchers (e.g., Goff, Evangelou, & Sylva, 2012; Vartuli & Winter, 1989) and laypeople agree that students' first teachers are their parents. As such, students' first school is their home. The home life, particularly the transitory nature of some students' home life (Audete, Algozzine, & Warden, 1993; Goff et al., 2012; Hofstter, 1999; Ingersol, Scamman, & Eckerling, 1989; Lee & Smith, 1999; Tucker, Marx, & Long, 1998), however, is detrimental to their academic success.

The United States has been defined as one of the most mobile countries in the developed world (Reynolds, Chen, & Herbers, 2009). As many as one in six Grade 3 students have attended more than three schools since their Grade 1 year (United States General Accounting Office, 1994). In 1998, over one-third of Grade 4 students had changed schools at least twice in the previous two years. More than one fifth of Grade 8 students and one tenth of Grade 12 students had attended at least two different schools in the previous two years as well (Rumberger, 2003). An exact mobility rate is difficult to calculate for the United States, due to differing definitions of mobility from state to state. However, the percentage of students who attend a school for less than a year may be between 30% and 40% (Ligon & Paredes, 1992). In Texas during the 2012-2013 school year over 875,000 students attended the same school for less than 83% of the school year (Texas Education Agency, 2014).

Mobile students (i.e., students who do not attend the standard progression of schools or attend the same school for less than a school year) have been reported to (a) perform lower academically than their peers who have not experienced mobility (Audete et al., 1993; Bruno & Isken, 1996; Hofstetter, 1999; Lee & Smith, 1999; Reynolds et al., 2009; Rumberger, 1995, 2003); (b) show an increase in behavior problems (Ellickson & McGuigan, 2000; Fomby & Sennott, 2013; Haynie, South, & Bose, 2006; Swanson & Schneider, 1999); and (c) drop-out of school at a higher rate (Gasper, DeLuca, & Estacion, 2012; Ross, 2014; Rumberger, 1995; Rumberger & Larson, 1998; South, Haynie, & Bose, 2007; Swanson & Schneider, 1999). These negative effects of mobility may be related to several issues including (a) students missing instruction due to their mobility (Branz-Spall, Rosenthal, & Wright, 2003; Kerbow, Azcoita, & Buell, 2003; Smith, Fein, & Paine, 2008; Smrekar & Owens, 2003); (b) insufficient information regarding student academic needs due to the delay of school record transfers (Branz-Spall et al., 2003; Franke, Isken, & Para, 2003; Kerbow et al., 2003; Smith et al., 2008; Smrekar & Owens, 2003); (c) lack of student connections to the new school (Franke et al., 2003; Haynie et al., 2006); (d) increased effects of low economic status (James & Lopez, 2003; Julianelle & Foscarinis, 2003; Thompson, Meyers, & Oshima, 2011); and (e) selecting and being accepted into a new peer group at their new school with fewer positive academic tendencies (Haynie et al., 2006; Schaller, 1975). Researchers (e.g., Rumberger, 2003; Schwartz, Stiefel, & Chalico, 2009) have suggested several reasons for students changing schools, and though a few causes of mobility (e.g., upward mobility) are for the betterment of the family and student, most causes (e.g., job loss, change in job, lower earnings, divorce, or death of a parent or parents) of mobility have negative effects on student achievement (Hartman, 2003; Schwartz et al., 2009).

Rumberger (2003) reported families living in poverty experience mobility often as a result of searching for jobs and support systems. The Bureau of Labor Statistics has produced research on job changes in the National Longitudinal Survey of 1979. The National Longitudinal Survey of 1979 contains information pertaining to the youngest of the baby boomers and contained data indicating that individuals held about 11 different jobs between the ages of 18 and 29 (Bureau of Labor Statistics, 2012). Frequent job changes or families seeking support systems lead to frequent moves for students (Hartman, 2003; Ligon & Paredes, 1992; Rumberger, 2002; Schwartz et al., 2009). Although these moves may be a sign of upward mobility for some individuals, the bulk of residential moves for school-age children are due to financial difficulties in their families. These moves often create school changes which can cause difficulties for students (Hartman, 2003; Rumberger & Larson, 1998; Schwartz et al., 2009).

Investigating the difficulties frequent school changes create is a relatively new area of study. The partnership between Boston University and Chelsea Public Schools is indicative of mobility's later entry onto the research community's interest. Boston University took over management of Chelsea, Massachusetts public school system in 1989. The partnership, designed to bring the best of current research to reform the failing Chelsea Public Schools, did not consider the school system's high mobility rate until the latter years of the partnership. The initial plan was designed to intervene early in the educational career of students, and the provided intervention would naturally translate into upper grade success. However, less than 15% of Chelsea Kindergarteners became Chelsea Graduates, due to mobility and not due to students dropping out of school. In 1996, seven years after the partnership started, the partnership began to investigate the effects of student mobility. By 2005 the partnership fully incorporated the impact of student mobility into their research and implemented measures to negate the effects of mobility (Candal, 2009).

Reasons for Mobility

Though the effects of mobility have not been adequately examined, researchers (Hartman, 2003; Lee & Burkam, 1992; Rumberger & Thomas, 2000; Schwartz et al., 2009; Vail, 1996) have identified three basic reasons for student mobility: parent/student choice, school choice, and residential mobility. Residential mobility is the most prevalent cause for student mobility, accounting for 58% of school moves across the country. Moves reported as due to school request only accounted for 10% of moves. In California this percentage was at its highest, 30% (Rumberger, 2003). Differences among these three types of causes of mobility may explain the differences in the outcomes of the mobility identified in the research.

Residential mobility can be caused by positive or negative factors; however, negative factors are more prevalent than positive factors (Hartman, 2003). Students living in poverty may have to move because their parents were not able to pay rent, housing code enforcement, or job loss (Hartman, 2003). Households without both biological parents experience mobility at a higher rate than households with both biological parents present (Lee & Burkam, 1992). The link between mobility and poverty creates difficulty in isolating a cause and effect relationship. Schools with high rates of students who are economically disadvantaged, Black or Hispanic, or retained also have high mobility rates even when controlling for background variables (Rumberger & Thomas, 2000; Thompson et al., 2011).

School districts generally support programs to mediate difficulties of students who are economically disadvantaged, Black or Hispanic, and retained students. However, the transient nature of mobile students and the lack of inclusion of mobile students in the school accountability subset reduces the likelihood schools can support programs to address the needs of their mobile students (Scherrer, 2013). School districts allowing school choice create differentiated programs where students can attend schools tailored to their unique learning needs or career prospects. However, as students change their minds about programs, or fail to meet the requirements of these programs, students may change schools and this mobility may begin to have an effect on the student's performance (Rumberger, 2003). The increasing availability of public charter schools may also increase mobility rates. Students in areas with a selection of public charters effectively have school choice. Students may leave the public school while transportation is available or meet the criteria of the charter school, but have to return when transportation becomes an issue, or the student no longer meets the criteria for the charter school.

Schools can contribute to the mobility of students and to the effects of the mobility. Schools policies regarding residency may require students to change schools mid-year, even if their parents are willing to transport the students to keep them in the same school. Transfers due to behavior, mandatory expulsions, and open enrollment policies can either require mobility (Rumberger, 2003), or create an illusion of a positive move without considering the negative effects the move may bring. School-initiated or school-encouraged moves are often linked to behavior; however, mobility has been identified as a possible cause of some problem behaviors (Gasper, DeLuca, & Estacion, 2010; Haynie et al., 2006; Simpson & Fowler, 1994). School districts allowing student moves due to behavior may be creating more problems for both the student and school districts than are solved.

Classroom Effects of Mobility

Although schools leaders may encourage some mobility in an effort to avoid further problems for themselves and/or the student, these school leaders may not understand the far reaching effects of mobility. Researchers (Kerbow, 1996; Lash & Kirkpatrick, 1990; Raudenbush, Jean, & Art, 2011; Rumberger, Larson, Ream, & Plardy, 1999; Smith, Smith, & Bryk, 1998) have documented the presence of negative effects on non-mobile students in schools with high mobility. In multiple studies (Hartman, 2003, Kerbow, 1996; Smither & Clarke, 2008), students and teachers alike identify the "chaos" effect (Rumberger, 2003, p. 11) that student mobility brings to the classroom. Students have described the difficulties caused by inconsistent project groups. Teachers also note the additional time spent on each student's orientation upon entry into the new class (Rumberger et al., 1999).

Hanushek, Kain, and Rivkin (2004, 2009) investigated the effects of student mobility from the standpoint of Tiebout mobility. Tiebout mobility is described as parents who are dissatisfied with their school, changing schools in pursuit of better educational opportunities. The strongest result Hanushek et al. (2004, 2009) could report, was not regarding mobile students, but regarding schools with high mobility rates. Students who changed schools only obtained marginal educational improvement if the student changed school districts. Students who changed schools within the school district did not indicate any improvement. Marked negative impact was present for students who remained in schools with high mobility rates.

Student Effects of Mobility

Debate exists among researchers (Alexander, Entwisle, & Dauber, 1996; Bourque, 2009; Gasper et al., 2010; Heinlein & Shinn, 2000; Hofstetter, 1999; Ingersoll et al., 1989; Kain & O'Brien, 1998; Lee & Smith, 1999; Nelson, Simoni, & Adelman, 1996; Temple & Reynolds, 1999) regarding whether negative academic effects are a result of mobility or other confounding variables. Hanushek et al. (2004, 2009) documented little to no improvement in school quality when students changed schools. However, a few researchers (Alexander et al., 1996; Gasper et al., 2010; Heinlein & Shinn, 2000; Ingersoll et al., 1989; Nelson et al., 1996; Temple & Reynolds, 1999) indicated insignificant or diminished negative effects of mobility when controlling for background variables such as ethnicity/race and economic status. Alexander et al. (1996) also provided support that negative effects of mobility were explained when controlling for previous academic achievement. However, several researchers (Bourque, 2009; Hofstetter, 1999; Kain & O'Brien, 1998; Lee & Smith, 1999) have documented negative effects even when considering prior academic achievement. Some researchers (e.g., Gasper et al., 2012) have utilized robust controls to match students based on risk factors for mobility and dropping out of high school and reported negative effects of mobility.

Gasper et al. (2012) determined mobility was most salient as a contributing factor to students dropping out of high school for students moderately at risk for dropping out based on other variables. Mobility is connected to negative student performance. Numerous researchers have documented the presence of negative effects of school mobility in academics (Audette et al., 1993; Kain & O'Brien, 1998; Kerbow, 1995; Lee & Smith, 1999; Reynolds et al., 2009; Rumberger et al., 1999; Smith et al., 2008; Smith et al., 1998), behavior (Ellickson & McGuigan, 2000; Fomby & Senott, 2013; Gasper et al., 2010; Haynie et al., 2006; Holand, Kaplan, & Davis, 1974; Jason et al., 1992; Rumberger et al., 1999; Schaller, 1975; Simpson & Fowler, 1994; Swanson & Schneider, 1999; Wood, Halfton, Scarla, Newacheck, & Nessim, 1993), dropout rate (Gasper et al., 2012; Haveman & Wolfe, 1994; Ross, 2014; Rumberger, 1995; Rumberger & Larson, 1998; South et al., 2007; Swanson & Schneider, 1999), and participation in extracurricular activities (Haynie et al., 2006; Pribesh & Downey, 1999; Rumberger et al., 1999; Scherrer, 2013). Researchers (Gasper et al., 2012; Langenkamp, 2011) also demonstrated different results of mobility when considering different types of students (e.g., high performing students vs. low performing students).

Attempted Solutions for Mobility Issues

Researchers (e.g., Bradshaw, Sudhinaraset, Mmari, & Blum; 2010; Franke et al., 2003; James & Lopez, 2003; Kerbow et al., 2003) described several programs and policies implemented to reduce the effects of mobility. Local and state school officials can implement policies designed to reduce mobility rates (Bradshaw et al., 2010; Franke et al., 2003; James & Lopez, 2003; Kerbow et al., 2003). Policies and practices can also be implemented to reduce the negative effects of mobility when it cannot be avoided (Bradshaw et al., 2010; Branz-Spall et al., 2003; Franke et al., 2003; Kerbow et al., 2003; Smrekar & Owens, 2003). Environmental factors have also been identified as contributing factors to the negative effects of mobility (Smrekar & Owens, 2003).

Local policies and practices can reduce the mobility rate by (a) allowing students to remain in the school in which they began that school year in regardless of residential moves (James & Lopez, 2003; Kerbow et al., 2003; Rhodes, 2007); (b) providing parents information regarding the negative effects of mid-year-mobility on their students (Kerbow et al., 2003; Rhodes 2007); (c) implementing programs to foster personal connections with families to discourage mobility (Bradshaw et al., 2010; Franke et al., 2003; Kerbow et al., 2003; Rhodes, 2007); and (d) providing social and medical services at the school, after school and during summer vacation. Families who are more attached to their school are less likely to move than are families who are less attached to their school (Kerbow et al., 2003; Rhodes, 2007). Researchers (Bradshaw et al., 2010; Branz-Spall et al., 2003; Franke et al., 2003; James & Lopez, 2003; Kerbow et al., 2003; Smrekar & Owens, 2003) also described programs designed to reduce the negative effects of mobility.

State officials can implement policies and support programs designed to reduce the negative effects of mobility. Programs designed and shown to have a positive impact on mobile students include the Migrant Education Program, which facilitates the transfer of records for migrant students (Branz-Spall et al., 2003). Project SMART which stands for Summer Migrants Access Resources through Technology and Project ESTRELLA which stands for Encouraging Students through Technology to Reach high Expectations in Learning Life skills and Achievement, provide funds for mobile students to have access to technology to create a more continuous educational experience (Branz-Spall et al., 2003).

School officials have provided programs and policies at the local level to assist mobile students by facilitating the efficient transfer of student records (Kerbow et al., 2003; Smrekar & Owens, 2003). Some districts have dedicated resources to transport students and parents to extracurricular activities and parent events to encourage participation and increase school connectedness (James & Lopez, 2003; Smrekar & Owens, 2003; Rhodes, 2007). Some programs require little additional resources such as providing student ambassadors also help increase school connectedness and reduce the negative effects of mobility (Franke et al., 2003; Rhodes, 2007).

Schools enrollment procedures and existing resource allocations can also assist in mitigating the negative effects of mobility. Systematic, immediate, and individual assessments designed to provide support for mobile students, both academically and socially, enable schools to meet the needs of mobile students more immediately (Bradshaw et al., 2010; Franke et al., 2003; Kerbow et al., 2003; Smrekar & Owens, 2003). Once students' needs are identified, school practices to enroll incoming students in to at-risk and extracurricular programs have shown a positive effect on mobile students. Traditional school practices may only give mobile students access to programs that have capacity or do not incur additional cost with additional students. Other programs are reserved for students included in the accountability subset, which the schools rating will be based on (Bradshaw et al., 2010; Franke et al., 2003). School officials must also provide parents information to be able to access programs to make their children's transition as seamless as possible (Bradshaw et al., 2010; Kerbow et al., 2003).

School district policies can also be enacted to assist mobile students. Facilitating uniform curriculum within and between school districts with identified regular mobility patterns reduces the curricular gaps experienced by many mobile students (Bradshaw et al., 2010; Kerbow et al., 2003; Smrekar & Owens, 2003). Providing teachers who are highly qualified and have extensive experience at the school is an effective means to increase the academic achievement of mobile students (Rhodes, 2007; Smrekar & Owens, 2003). Establishing systems to provide assessments aligned to standards to guide strategic interventions assist these teachers in meeting the needs of mobile students. Small school size allows school faculty to gain a more in-depth knowledge of student needs (Rhodes, 2007; Smrekar & Owens, 2003).

Despite quality programs and practices designed to reduce mobility rates and reduce the negative effects of mobility, environmental factors may also play a part in the academic and behavioral outcomes for mobile students. Environmental factors researchers (Smrekar & Owens, 2003) have identified as influencing the effects of mobility include (a) the community's attitude toward academic success, (b) the presence of drugs and alcohol, and (c) the family support for the school discipline program (Smrekar & Owens, 2003). These environmental factors are beyond the control of most school systems, and larger systems may be needed to affect these factors.

School administrators at the local district level have the ability to implement policies designed to reduce mobility rates by facilitating students remaining in the school the student starts the year in. School districts commonly have policies dictating where students attend school based on their residential address. When this address changes due to residential mobility, the student is either required to move due to policy, lack of transportation, or both. Some schools have addressed this issue, creating school zoning policy allowing students to finish the school year in the school in which the students begins regardless of their residential address (Kerbow et al., 2003; Rhodes, 2007).

Federal legislators have provided legislation to ensure students qualifying as homeless are allowed to remain in a school regardless of a change in address. The McKinney-Vento Homeless Education Improvements Assistance Act of 2001 requires schools to allow students who qualify as homeless to remain in their homeschool for the remainder of the school year, attend the school servicing their temporary residence, or remain in a school if their temporary residence changes. Schools are also required to provide transportation for these homeless students (James & Lopez, 2003; Julianelle & Foscarinis, 2003; Pavlakas, 2014). Some schools have implemented a broader approach, allowing students who do not qualify as homeless, but who change residence within the district during the year, transportation to their initial school (James & Lopez, 2003; Rhodes, 2007). Houston Independent School District has even included providing transportation to extra-curricular activities and providing transportation for parents to teacher conferences and parent events to encourage students to remain at the same school for an entire year (James & Lopez, 2003).

Funding for these types of programs is typically a barrier to their implementation. The transportation mandated for homeless students does not entitle school districts to additional state or federal funding. However, Victoria Independent School District in Texas experienced a $1.8 million increase in attendance-based funding when the district implemented their transportation program. Additionally, the schools in this district experienced increases in academic achievement on state assessments, with larger gains attributed to schools more affected by mobility (James & Lopez, 2003).

Schools can also implement programs designed to reduce mobility by increasing students' and families' connections to the school and knowledge about the detrimental effects of changing schools mid-year. The Moffat School in Los Angeles California ensures mobile students are connected to the school by encouraging them to get involved with programs such as band and other school clubs and organizations. This greater connection to school extracurricular activities discourages mobility (Franke et al., 2003). The Comprehensive Community Schools program provides social programs such as medical and additional nutritional services, tutorials, and after school and summer care programs at no cost to parents (Kerbow et al., 2003). The mobility rates at these schools were reduced within three years of their implementation (Kerbow et al., 2003). Schools with strong connections to their students' families can also provide trusted information to parents regarding the negative effects of moving during the year. Parents with strong ties to a school, who have been provided with information about the negative effects of mobility, may be given permission to keep their students at a school despite a residential move, and assistance to keep their students in a school are more likely to avoid changing schools during the year if at all possible (Franke et al., 2003; James & Lopez, 2003; Kerbow et al., 2003; Smith et al., 2008).

Educational leaders at the state and local level have the ability to fund, support, or implement programs designed to reduce the negative effects of mobility. The negative effects of mobility, for mobile students, are most often related to (a) students missing instruction due to their mobility (Branz-Spall et al., 2003; Kerbow et al., 2003; Smith et al., 2008; Smrekar & Owens, 2003); (b) insufficient information regarding student academic needs due to the delay of school record transfers (Branz-Spall, 2003; Franke et al., 2003; Kerbow et al., 2003; Rhodes, 2007; Smith et al., 2008; Smrekar & Owens, 2003); (c) lack of student connections to the new school (Franke et al., 2003; Scherrer, 2013) or selecting and being accepted into a new peer group at their new school with fewer positive academic tendencies (Haynie et al., 2006; Schaller, 1975); and (d) increased effects of low economic status (James & Lopez, 2003; Julianelle & Foscarinis, 2003; Thompson et al., 2011).

Mobile students may experience gaps in instructional continuity for multiple reasons. The process of moving from one place to another may take multiple days when enrolling in a new school. Issues of supplies, dress code, and campus orientation may delay entry into the classroom, and the classrooms students enter may be utilizing course plans not aligned with the schools the student left (Rumberger, 2003; Smith et al., 2008; Smrekar & Owens, 2003). In schools, where regular mobility patterns have been identified, curricular alignment can reduce the gaps mobile students' experience (Smith et al., 2008; Smrekar & Owens, 2003). The Department of Defense Education Activity maintains curricular alignment across its schools so students transferring from base to base do not experience curricular gaps (Smrekar & Owens, 2003). Programs providing technology to mobile students to enable them to receive continuous curriculum despite their mobility have been implemented. As mentioned earlier, Project ESTRELLA, and Project SMART, allow access to technology for students, whose families are migrant workers, so that curricular continuity can be maintained through distance education (Branz-Spall et al., 2003).

When students transfer into a school, school officials must place students appropriately in classes for remediation or enrichment so their academic needs are met (Branz-Spall et al., 2003; Franke et al., 2003; Kerbow et al., 2003; Rhodes, 2007; Smith et al., 2008; Smrekar & Owens, 2003). The Department of Defense Education Activity schools maintain a records transfer system which ensures records are available immediately when students transfer into a new school. This system gives the receiving teachers instant access to information regarding their new students' test scores and allows teachers to address students' academic needs as soon as the students arrive. The Department of Defense Education Activity schools also maintain agreements with local schools so students who transfer to local schools not on their bases may also have access to this information (Smrekar & Owens, 2003).

When immediate record transfer is not available, school officials can utilize assessments given when students arrive to a new school. In instances where the school does not formalize the assessment process, teachers may use inaccurate informal assessments which can take an extended amount of time to gain an understanding of students' true needs (Kerbow et al., 2003). Schools that have experienced success overcoming the negative effects of mobility have implemented a systematic process to assess students' academic needs immediately when students arrive. These schools can appropriately place the students in remediation or enrichment activities (Branz-Spall et al., 2003; Franke et al., 2003; Kerbow et al., 2003; Rhodes, 2007; Smith et al., 2008; Smrekar & Owens, 2003).

Students who experience mobility at a high rate may find it difficult to connect with their newly enrolled schools. Mobile students are more likely to select peer groups, or be admitted into peer groups, with reduced school engagement, reduced expectations for academic achievement, and reduced expectations for college graduation (Haynie et al., 2006). This lack of connection and expectations can lead to lower academic achievement and an increased likelihood of mobility (Scherrer, 2013). The Department of Defense Education Activity schools assign incoming students a buddy student to help them get their bearings at the new school (Smrekar & Owens, 2003). The Moffat School in Los Angeles also utilizes students to help acclimate new students into their school culture and ensure the incoming students have an easier transition (Franke et al., 2003). The Bethel School District in Eugene, Oregon required regular and frequent visits by the counselors with transferring students to ensure their smooth transition. Follow-up parent conferences were also encouraged to check for any additional needs the students or their families might have (Smith et al., 2008).

Families experiencing mobility during the school year are often simultaneously experiencing negative economic conditions influencing the children's education (Alexander et al., 1996; Hartman, 2003; James & Lopez, 2003; Julianelle & Foscarinis, 2003; Scherrer, 2013) such as homelessness. The McKinney-Vento Act provides funds for homeless students to receive appropriate school clothes and school supplies as well as transportation to school. These supplies help to meet students' physical needs, and limit the amount of time students miss school due to not having adequate supplies or clothing (Julianelle & Foscarinis, 2003). The Houston Independent School District has also provided transportation for students to extra-curricular activities and for parents to attend parent conferences and other events such as open houses (James & Lopez, 2003).

Some factors contributing to the effects of mobility are difficult to control in most situations. The Department of Defense Education Activity has shown especially high performance among students attending schools with a high mobility rate; however, several environmental effects are controlled as a result of the school being housed on a military base. These environmental effects may limit the generalizability of other programs and policies designed to reduce the effects of mobility implemented in Department of Defense Education Activity schools. Also, the state of military activity may also influence students' general success or lack of success (Bradshaw et al., 2010). Although the residential areas served by Department of Defense Education Activity schools match most public housing in regards to income and education level; however, the crime rate, rate of drug and alcohol abuse, domestic violence, and gang activity contrast sharply (Smrekar & Owens, 2003). The military establishment that these schools are housed in reinforces a commitment to achievement and sense of community. School discipline can be linked to parents' loss of housing privileges, and parent involvement in schools is considered a part of the parents' duties (Smrekar & Owens, 2003). These environmental factors also increase student success rates in Department of Defense Education Activity schools.

Statement of the Problem

Documentation on several issues affecting mobile students have been provided, including: (a) reduced academic achievement (Audette et al., 1993; Bruno & Isken, 1996; Hofstetter, 1999; Lee & Smith, 1999; Reynolds et al., 2009; Rumberger, 1995, 2003); (b) increased behavior issues (Ellickson & McGuigan, 2000; Fomby & Sennott, 2013; Haynie et al., 2006; Swanson & Schneider, 1999); and (c) increased dropout rates

(Gasper et al., 2012; Ross, 2014; Rumberger, 1995; Rumberger & Larson, 1998; South et al., 2007; Swanson & Schneider, 1999). Mobility is not only an issue for students who move. Mobility is also an important issue for non-mobile students, because non-mobile students have been identified as having poorer academic achievement in schools with high mobility rates (Hirsch, 2006; Kerbow, 1996; Rumberger et al., 1999; Smith et al., 1998; Williams, 2003). Both teachers and students report that new students entering classrooms is disruptive and makes academic progress difficult (Hanna, 2003; Lash & Kirkpatrick, 1990; Raudenbush et al., 2011; Rumberger et al., 1999). Researchers (e.g., Kerbow, 1996; Smither & Clarke, 2008; Williams, 2003) have provided documentation of classrooms with high mobility rates being as much as a year behind more stable classrooms by Grade 5. The challenge of tracking these mobile students and lack of accountability for them does not provide adequate incentive for schools to expend already tight resources to mediate the negative effects of mobility (Branz-Spall et al., 2003; Scherrer, 2011).

Of the many different aspects of the effects of mobility on students, researchers (e.g., Bourque, 2009; Heinlein & Shinn, 2000; Rumberger, 2003) who have investigated the effects on student academic achievement have provided limited definitive information. A consensus has not yet been generated regarding the effects of mobility on student academic achievement (Bourque, 2009; Heinlein & Shinn, 2000; Rumberger, 2003). Differing methodologies and difficulty controlling for confounding variables contributes to the lack of consensus making generalizability of the studies difficult (Reynolds et al., 2009; Rumberger, 2003).

Researchers (Gasper et al., 2012) have also identified that differences in students can create differences in the effects of mobility. Gasper et al. (2012) provided data to support changing high schools leads to students dropping out of high school. However, students with moderate preexisting risk factors for dropping out are most affected by school mobility. Mobility affects students differently: high performing students can lose their competitive edge when moving to a new school, and weak students already in danger of dropping out are subject to additional risk factors after a move (Langenkamp, 2011).

Most researchers (Bourque, 2009; Gasper et al., 2012; Hanushek et al., 2004, 2009; Haynie et al., 2006; Hofstetter, 1999; Lee & Smith, 1999; Reynolds et al., 2009; Rumberger & Larson, 1998; Rumberger et al., 1999; Scherrer, 2013; Smith et al., 2008; South et al., 2007; Swanson & Schneider, 1999; Temple & Reynolds, 1999) who have analyzed the effects of mobility agree on the immediate negative effects of mobility. However, a few researchers (Heinlein & Shinn, 2000; Pribesh & Downey, 1999; Ream, 2005) have determined the immediate effects of mobility are eliminated when prior academic achievement and demographic factors, such as economic status, are taken into consideration. Less consensus exist regarding the lingering effects of mobility. Some researchers (Hanushek et al., 2004, 2009; Rumberger et al., 1999; Temple & Reynolds, 1999) have concluded the effects of mobility are eliminated over time if an increase is present in the quality of schools attended by mobile students.

Research regarding mobility is often limited by the data collected on mobile students. Few states track students' academic achievement over time as students move between schools. Most researchers (Bourque, 2009; Heinlein & Shinn, 2000; Lee &

Smith, 1999; Rumberger et al., 1999; Temple & Reynolds, 1999) have only been able to track students at one point in time (Haynie et al., 2006; Rumberger et al., 1999) or within a local school system (Bourque, 2009; Grigg, 2014; Heinlein & Shinn, 2000; Lee & Smith, 1999; Temple & Reynolds, 1999). The research, undertaken for large systems, such as a state, has produced varying results due to varying controls.

Hanushek et al. (2004, 2009) controlled for prior academic achievement and demographic factors including economic status. Hanushek et al. (2004, 2009) documented the presence of negative initial effects of mobility when entering a new school system, but could not find a link between lowered academic achievement and mobility after several years in the new school. Rumberger et al. (1999) did not control for either prior academic achievement or demographic factors and also indicated negative initial effects were present; however, positive long-term effects existed when school quality increased. Smith et al. (2008) and Scherrer (2013) also established the presence of negative initial effects when controlling for both prior academic achievement and demographic factors but did not draw conclusions about long-term effects. Haynie et al. (2006) concluded the effects of mobility lasted at least two years after considering a national survey including a non-continuous data point indicating if the respondents lived at their current residence for less than a year, one year, two years, three years, four years, five years, six years, or more than six years, but was not able to control for prior achievement or behavior.

Purpose of the Study

The first purpose of this journal-ready dissertation was to investigate the relationship of mobility to student achievement in Grade 6 students when controlling for economic status and not controlling for economic status. The second purpose was to examine the relationship of mobility to Grade 7 students' academic achievement when controlling for and not controlling for economic status. Finally, the third purpose was to examine the relationship of mobility to the academic achievement of Grade 8 students when controlling for and not controlling for economic status.

The purpose of this journal-ready dissertation was to examine the relationship of mobility to the academic achievement of middle school students when controlling for economic status. Over 700,000 mobile students attended school in Texas in 2012 according to the Texas Education Agency (2013a) Academic Excellence Indicator System definition. Researchers (Alexander et al., 1996; Heinlein & Shinn, 2000; Hofstetter, 1999; Lee & Smith, 1999; Scherrer, 2013; Temple & Reynolds, 1999) who have investigated economic status and prior academic achievement have provided differing results regarding whether the negative effects of mobility persist or how long the negative effects persist. Researchers who have supported persisting effects of mobility include but are not limited to Hofstetter (1999), Lee and Smith (1999), and Scherrer (2013). Researchers who have supported effects of mobility being eliminated over time include Alexander et al. (1996), Gruman, Harachi, Abbott, Catalano, and Fleming (2008), Heinlein and Shinn (2000), and Temple and Reynolds (1999). Accordingly, in this research the relationship between mobility and academic achievement, as measured by Texas Assessment of Knowledge and Skills (TAKS) Reading, Mathematics, and Science tests, was analyzed for middle school students (i.e., Grades 5 through 8). In this journal-ready dissertation, a similar design to Heinlein and Shinn (2000), who established the presence of negative effects of mobility were eliminated when controlling for economic status was used. Data from across the state of Texas were analyzed in this journal-ready dissertation.

Significance of the Study

Several researchers (Bourque, 2009; Gasper et al., 2010, 2012; Haynie et al., 2006; Hanushek et al., 2004, 2009; Hofstetter, 1999; Lee & Smith, 1999; Reynolds et al., 2009; Rumberger & Larson, 1998; Rumberger et al., 1999; Scherrer, 2013; Smith et al., 2008; South et al., 2007; Swanson & Schneider, 1999; Temple & Reynolds, 1999) who have analyzed mobility have established school mobility may be a factor contributing to negative educational outcomes for mobile children. Unfortunately, these studies are typically limited to data from within a school system such as the New York City school system (Heinlein & Shinn, 2000), the Chicago public school system (Kerbow, 1995 & 1996; Temple & Reynolds, 1999), or the Chelsea, Massachusetts public school system (Bourque, 2009). Researchers (e.g., Gasper et al., 2010; Rumberger et al., 1999) who have examined mobility across larger areas, such as a state, have utilized limited interviews and surveys as a part of national research initiatives such as the National Educational Longitudinal Study (NELS) and NELS: High School Effectiveness Study (HSES). Only a limited sample size (surveys of 1,114 eighth-graders, 51 high schools, interviews with 19 high school students and 32 school employees from two districts) was utilized with these methods compared to the large population size (California Public schools had over 400,000 eighth-graders in 1999), reducing the power of the study.

Researchers (e.g., Haynie et al., 2006; Smith et al., 2008) who have utilized a sufficient sample size compared to the population size did not control for prior academic achievement or demographic differences. Smith et al. (2008) compared student scores from 34 schools across Oregon on the Stanford Achievement test and the Dynamic Indicators of Basic Early Literacy Skills Oral Reading Fluency test. Smither and Clarke (2008) grouped students into three categories of mobility and compared their scores. In the Smither and Clarke (2008) investigation, evidence was obtained supporting that mobile students performed below non-mobile students. Smith et al. (2008) also identified best practices from schools which produced data better than the statewide results.

The research on mobility is also limited to mostly elementary school grade levels, with only a few high school studies available. Few researchers (Scherrer, 2013) have considered mobility occurring in middle school and academic achievement in middle school. Scherrer (2013) used data from the Early Childhood Longitudinal Study, K-8 (ECLS-K) and identified many negative effects of mobility. Smith et al. (2008) documented negative effects on reading achievement for second-grade mobile students. Heinlein and Shinn (2000) supported the negative effects of mobility on Grade 6 students are eliminated when controlling for Grade 3 achievement; however, Heinlein and Shinn (2000) cautioned overgeneralizing their results due to sample bias. Rumberger et al. (1999) utilized the National Educational Longitudinal Study (NELS) and NELS: High School Effectiveness Study (HSES) to consider the negative effects of mobility on both mobile and non-mobile students in Grade 8 and High School. Temple and Reynolds (1999) stated negative mobility effects on Grade 7 students were eliminated when considering participation in kindergarten but were present when controlling for several other family characteristics and prior academic achievement. The critical nature of middle level education (Lounsbury, 2010) requires middle level educators understand the nature of factors negatively affecting young adolescents (Sink, 2005).

This study will consider a sample of student from across the state of Texas including over 200,000 students per grade level, per subject, per year. The data set provides information from measures of multiple types of academic achievement (i.e., TAKS Reading, Mathematics, Writing, and Science academic achievement). Research indicating the consistent manner a factor such as mobility can have on students' academic achievement is useful to policymakers and school officials. Such research will provide justification for lawmakers and school officials to dedicate resources to programs addressing mobile students' needs.

Definition of Terms

The following terms, critical to the understanding of this journal-ready dissertation, are now defined for the reader.

Academic Excellence Indicator System

The Academic Excellence Indicator System was the system the state of Texas used to aggregate performance and other data regarding school districts and schools in Texas (Texas Education Agency, 2013b). Yearly information was pulled and reports were generated at the school and district level. Student level data were pulled from the Public Education Information Management System and testing contractors (Texas Education Agency, 2013b). The system was established by House Bill 72 in 1984 (Texas Education Agency, 2013b). The Academic Excellence Indicator System has now been replaced by the Texas Academic Performance Report.

Accountability Subset

The accountability subset is the group of students who were in attendance on the last Friday in October of the school year and were in attendance on the date the TAKS test was administered (Texas Education Agency, 2012). These students' data are considered in calculating a campus's accountability rating (Texas Education Agency, 2012). For example: a student who enrolls in a school on the last Friday in October and withdraws from school the following week, but returns to the school and re-enrolls the week of state testing is considered a part of the school's accountability subset, and the school will be held accountable for the student's passing or failing the test. However, a student who enrolls on November 1 and remains enrolled in the school for the remainder of the year is not included in the accountability subset.

Economic Disadvantage

The Texas Education Agency defines students as economically disadvantaged if they qualify for free or reduced-price lunch or other public assistance (Texas Education Agency, 2012). This measure is also used as the basis for funding under Title I of the Elementary and Secondary Education Act. The percent of these students in a school are regularly used as a measure of poverty affecting a school.

Mobile Student

In the Texas accountability system a mobile student is defined as a student who has been enrolled at a particular campus less than 83% of the school year, approximately not enrolled more than six weeks (Texas Education Agency, 2012). This definition is not the same definition for mobile as used in the TAKS participation section of the Academic Excellence Indicator System report. Mobile in the TAKS participation section only refers to the students who are not included in the accountability subset (Texas Education Agency, 2012). The mobility rate is generally higher than mobile in the TAKS participation section of the Academic Excellence Indicator System report.

Public Education Information Management System

The Public Education Information Management System is the educational system in Texas used to collect and store data from all public schools and districts in the state (Texas Education Agency, 2013b). Data stored in this system relevant to this study include student demographic and program participation data; student attendance and course completion data; retention and "school leaver" (Texas Education Agency 2013b, PEIMS) information.

Texas Assessment of Knowledge and Skills (TAKS)

Academic achievement in this study will be derived from scores on the different subject area tests of the TAKS. The TAKS test is "a comprehensive testing program for public school students in grades 3-11. The TAKS is designed to measure to what extent a student has learned, understood, and is able to apply the concepts and skills expected at each tested grade level," (Texas Education Agency, 2012, TAKS). Subjects tested and grades tested relevant to this research are: Grade 3 Mathematics and Reading; Grade 4 Mathematics, Reading, and Writing; Grade 5 Mathematics, Reading and Science; Grade 6 Mathematics and Reading; Grade 7 Mathematics, Reading, and Writing; and Grade 8 Mathematics, Reading, and Science (Texas Education Agency, 2012). Grade 3, 5, and 8 Mathematics and Reading tests are given earlier in the year, and students have multiple chances to take the tests if the students do not successfully meet the set standards the first time (Texas Education Agency, 2012).

TAKS Mathematics Test

The TAKS Mathematics assessment was designed to measure students understanding of mathematical concepts which will enable them to find answers to real life problems and “think logically, solve problems, and understand spatial relationships,” (Texas Education Agency, 2008, p. 4). Six objectives are included in the mathematics assessment. These objectives are provided to guide educators and parents in understanding where their students have excelled or may need assistance. Certain portions of the state required curriculum may occur under more than one objective. Objectives included in the mathematics test are: “1) numbers, operations, and quantitative reasoning; 2) patterns, relationships, and algebraic reasoning, 3) geometry and spatial reasoning; 4) measurement; 5) probability and statistics; [and] 6) mathematical process and tools” (Texas Education Agency, 2008, p. 7)

TAKS Reading Test

The TAKS Reading assessment was designed to measure students’ ability to read effectively for varied purposes. The TAKS Reading assessment evaluates the state required curriculum associated with the reading portion of the English language arts curriculum. The TAKS Reading assessment is organized into four objectives to help parents and educators understand areas where students have succeeded or may need more assistance. Certain portions of the state required curriculum may fit into more than one objective. The objectives tested by the reading portion of the TAKS test are: “1) the student will demonstrate a basic understanding of culturally diverse written text; 2) the student will apply knowledge of literary elements to understand culturally diverse written text; 3) the student will use a variety of strategies to analyze culturally diverse written text; [and] 4) the student will apply critical-thinking skills to analyze culturally diverse written text” (Texas Education Agency, 2004b, p. 4).

TAKS Science Test

The TAKS Science assessment, designed to assess students' mastery of the state-mandated curriculum, test is inclusive of state required curriculum from the preceding years since the last TAKS Science test (i.e., the Grade 5 TAKS Science test covers Grade 2 through Grade 5 science required curriculum; the Grade 8 TAKS Science test covers Grade 6 through Grade 8 required curriculum). The Grade 5 TAKS Science test is divided into four objectives to help parents and educators better understand where students may have succeeded and may need additional assistance (Texas Education Agency, 2004a). The Grade 8 TAKS Science test is divided into five objectives for the same purpose (Texas Education Agency, 2005). Objectives covered on the Grade 5 TAKS Science test are: (a) "the student will demonstrate an understanding of the nature of science" (Texas Education Agency , 2004a, p. 15); (b) "the student will demonstrate an understanding of the life sciences" (Texas Education Agency, 2004a, p. 22); (c) "the student will demonstrate an understanding of the physical sciences" (Texas Education Agency, 2004a, p. 28); and (d) "the student will demonstrate an understanding of the earth sciences" (Texas Education Agency, 2004a, p. 34).

Objectives included on the Grade 8 TAKS Science test are: (a) "the student will demonstrate an understanding of the nature of science" (Texas Education Agency, 2005, p. 16); (b) "the student will demonstrate an understanding of living systems and the environment" (Texas Education Agency, 2005, p. 24); (c) "the student will demonstrate an understanding of structures and properties of matter" (Texas Education Agency, 2005, p. 29); (d) "the student will demonstrate an understanding of motion, forces, and energy"

(Texas Education Agency, 2005, p. 33); and (e) "the student will demonstrate an understanding of earth and space systems" (Texas Education Agency, 2005, p. 38).

TAKS Writing Test

The TAKS Writing assessment was designed to measure students' ability to write effectively for varied purposes. The TAKS Writing assessment evaluates the state required curriculum associated with the Writing portion of the English language arts curriculum. The TAKS Writing assessment is organized into six objectives to help parents and educators understand areas where students have succeeded or may need more assistance. These objectives are consistent between the Grade 4 and Grade 7 TAKS. (Texas Education Agency, 2004c, 2004d).

Texas Essential Knowledge and Skills (TEKS)

The TEKS are the state of Texas' adopted curriculum. Implemented in September of 1998 to replace the Essential Elements, the TEKS outline what students should know at each grade level, and at what level students should be able to demonstrate the required knowledge (Sherman & Jones, 2008).

Theoretical Frameworks

Three theories were chosen to guide this research on the link between academic achievement and mobility: school connectedness theory, social capital theory, and peer group externalities. School connectedness theory indicates students who feel cared for and a part of their school are less likely to participate in negative social behaviors and be more engaged in their schooling (Blum, 2005; Fredricks, Blumenfeld, & Paris, 2004; Marandos & Randall, 2012; McNeely, Nonnemaker, & Blum, 2002). Researchers (Coleman, 1988, 1990; Lin, 2001; Parcel & Pennell, 2012; Portes, 1998; Woolcock,

1998) advancing social capital theory indicate families with less social capital do not have the connections or social knowledge to effect change. The reduced social capital of mobile families may create unintended consequences of accountability systems. Actions taken by schools and teachers to meet the standards of state and federal accountability systems may be detrimental to individual students (Scherrer, 2011, 2013). Researchers (Banerjee & Besley, 1991; Hanushek et al., 2004, 2009; Scherrer, 2013) supporting peer group externalities theory contend mobile students' reduced academic achievement is affected by individuals' peers, which in high mobility schools can lead to reduced academic achievement for both the mobile and stable student.

School Connectedness Theory

Rumberger et al. (1999) contended students who experience mobility are less likely to participate in extra-curricular activities than students who do not experience mobility. Participation in extra-curricular activities is a common way to create connections to a student's school. Blum (2005) connected academic achievement to students' feeling as a part of the school, and participation in extracurricular activities as a way to promote school connectedness. Students may have higher academic achievement and lower negative social behaviors when the students feel more connected to their school (Fredricks et al., 2004). Marandos and Randall (2012) provided evidence indicating increasing school connectedness can lead to higher school engagement and academic achievement. Mobile students, particularly those students who experience multiple school moves, have difficulty connecting with schools the students know they will not attend for long (Rumberger, 2003; Rumberger et al., 1999). Mobile students may also participate in extra-curricular activities at a lower rate than non-mobile students

(Rumberger et al., 1999). Langenkamp (2011) contended that participation in extracurricular activities was a protective factor against the negative effects of mobility during high school and for students not transitioning from middle to high school with their common cohort. These barriers to feeling like the student is a part of the school may inhibit mobile students' school achievement. Students who do not directly experience mobility may further have difficulty feeling like a part of the school when the composition of the school is in constant flux.

Social Capital Theory

In social capital theory, attempts are made to relate a student's or family's ability to effect change, and gain access to and utilize resources through their knowledge of social norms and connections (Coleman, 1988, 1990; Lin, 2001; Parcel & Pennell, 2012; Portes, 1998; Woolcock, 1998). After a move, social capital must be rebuilt to some extent. Depending on the type of move and the various differences between the locations, students and families may have greater difficulty rebuilding social capital. Coleman (1988) used residential mobility as an indicator of social capital. Stanton-Salazar and Dornbusch (1995) concluded rebuilding social capital can be more difficult when a language difference exists between the original and new locations.

Current accountability systems both at the federal (No Child Left Behind, 2002) and state level tend to measure student performance based on students who are enrolled at the school by a certain time and at the time of the high-stakes test. These criteria create an accountability subset schools expend the majority of their resources serving. Even schools subject to value-added performance criteria have a reduced incentive to give extra effort to students with an incomplete data set. Mobile students are typically not enrolled at the same school for the initial and final assessment (Scherrer, 2011). Families with reduced social capital have difficulty acquiring these services for their children. These unintended consequences of accountability systems contribute to lower performing mobile students; an additional unintended consequence of accountability is the reduced connection of mobile students to school.

Peer Group Externalities

Researchers (Hanushek et al., 2004, 2009; Haynie et al., 2006; Kerbow, 1996; Lash & Kirkpatrick, 1990; Raudenbush et al., 2011) have indicated mobile students also have negative effects on non-mobile students. The “chaos” (Rumberger et al., 1999, p. 31) predicated by a constant influx of students (e.g., Smither & Clarke, 2008) causes classrooms to lag as much as a year behind more stable classrooms (Kerbow, 1996). Researchers (e.g., Banerjee & Besley, 1991; Scherrer, 2013) who support peer group externalities theory indicate students tend to norm themselves based on the students around them and are affected by the students around them. Mobile students many issues may reduce their academic achievement and pro-social behavior. A high percentage of mobile students at a particular school campus also tend to reduce the academic achievement and pro-social behavior of students who have not recently experienced mobility at high and hypermobile schools.

Procedures

Data for these journal ready research investigations were requested from the Texas Education Agency Public Education Information Management System. Information regarding demographic data, student mobility status, and TAKS test scores for all Grade 3 through Grade 8 students for the 2002-2003 through the 2007-2008 school years were requested. Approval was sought and obtained from the researcher's doctoral dissertation committee. After approval from the dissertation committee was obtained, approval from the Sam Houston State University Institutional Review Board was requested. When approval was granted by the Institutional Review Board, the data acquired through a Public Information Request to the Texas Education Agency were analyzed. The dataset provided was converted into a Statistical Package for the Social Sciences data file for analysis purposes. Variables analyzed in these journal ready research investigations included: whether or not the student was mobile (i.e., enrolled at the testing school less than 83% of the school year was defined as mobile) or economically disadvantaged; and TAKS Reading raw scores (Grade 6, 7, and 8), TAKS Mathematics raw scores (Grade 6, 7, and 8), TAKS Writing raw scores (Grade 7), and TAKS Science raw scores (Grade 8).

Literature Review Search Procedures

Literature on the topic of mobility was reviewed for this journal-ready dissertation. Articles were selected by searching Google Scholar using the search terms school mobility and student and adding a time restraint of articles published since the year 2000. This process produced several articles from Volume 72 of the *Journal of Negro Education* (2003). This volume was titled *Student Mobility: How Some Students Get Left Behind*. The 15 articles in this volume were reviewed and the articles cited were reviewed. The most recent dissertation with a keyword of student mobility available in ProQuest Dissertations and Theses Full Text was also reviewed and the 183 articles cited within it were reviewed. This dissertation (Grigg, 2014) was published in 2014; therefore a Google Scholar search for school mobility within the title of articles published since

2014 was completed to glean the most recent research on the topic of mobility. This search returned 85 articles. These articles were reviewed specifically for (a) connections to secondary student mobility; (b) the prevalence of mobility; (c) causes of mobility, (d) consequences of mobility, for both students and schools; and (e) solutions for schools and students affected by mobility.

Delimitations

This journal-ready dissertation was delimited to students who attended public schools in Texas in their Grade 3 and Grade 6 years, in their Grade 4 and Grade 7 years, or in their Grade 5 and Grade 8 years. This journal-ready dissertation was also delimited by the definition of mobility in Texas (i.e., attended a school less than 83% of the school year). The state-mandated assessments of academic achievement, TAKS tests, also delimited this study.

Limitations

Student achievement can be affected by many factors. Only the factors of mobility, economic status, and prior academic achievement were considered in this journal ready dissertation. School administrators can, and some have, implement certain practices mitigating the effects of mobility. Programs are in place in areas where mobility is more common than stability. Department of Defense Education Activity takes specific measures to mitigate the effects of their students' highly mobile lifestyles (Smrekar & Owens, 2003). Other examples of programs designed to meet the needs of mobile students are located in Texas (James & Lopez, 2003), Minneapolis (Hinz, Kapp, & Snapp, 2003), California (Franke et al., 2003), and Chicago (Kerbow et al., 2003). The differences among schools due to school administrators implementing these programs and other differences in school quality may have led to differential selection. Differential selection (Johnson & Christensen, 2008) is an internal threat to the validity of this study. Participants whose data will be analyzed in this journal-ready dissertation attend schools across Texas. In these schools varying levels of school quality existed. Students who attend schools of different qualities may have shown different levels of academic achievement. Hanushek et al. (2004, 2009) identified mobility for the purpose of obtaining a better school, and may negate the initial negative effects of mobility when academic achievement is measured more than one year after the mobility occurred. The difference in school quality between the sending school and the receiving school was not considered in these studies.

Temporal validity (Johnson & Christensen, 2008) may also have been a threat to external validity in these studies. The TAKS data used came from administrations three years apart and from different grade levels. The difficulty level of the TAKS exams increases from grade level to grade level (Texas Education Agency, 2008). Only data on students who took the general version of the TAKS test were considered in the proposed study, students with special needs who took a modified version of the TAKS test, and students who were learning English as a second language who took a language accommodated test were excluded from the proposed study. These students are graded on a different scale and their results would not be readily comparable to students taking the general version of the test.

Data from the TAKS test, which is no longer Texas' standardized assessment, from the 2003 to the 2008 school years were utilized in this study. Data from the current Texas standardized assessment, the State of Texas Assessment of Academic Readiness test, were not utilized because it has not been in use for a long enough time period to allow for longitudinal analysis. Issues have also occurred with the implementation of the State of Texas Assessment of Academic Readiness, thus preventing its use at the current time as an indicator of academic achievement.

Assumptions

In this study, TAKS test scores were assumed to be an accurate depiction of students' academic achievement. Individual subject assessments are designed around the TEKS which should, according to statute, provide the basis for curriculum in all public schools across the state. The curriculum required by the state includes the subject matter and the rigor expected to be taught at each grade level (Sherman & Jones, 2008). Student mobility is also assumed to be the same for all students. However, evidence has been provided (Hanushek et al., 2004, 2009) indicating some mobility may be to attend a better school. This type of mobility may have eliminated the initial negative effects over two to three years.

Organization of the Study

The problem addressed in this journal-ready dissertation was divided into three empirical investigations. In the first article, research questions regarding Grade 6 academic achievement (i.e., TAKS Reading and Mathematics raw scores) with and without controls for economic status (i.e., eligibility for the federal free or reduced lunch program) were analyzed. In the second article, research questions regarding Grade 7 academic achievement (i.e., TAKS Reading, Mathematics, and Writing raw scores) with and without controls for economic status (i.e., eligibility for the federal free or reduced lunch program) were analyzed. Finally, in the third article, research questions regarding

Grade 8 academic achievement (i.e., TAKS Reading, Mathematics, and Science raw scores) with and without controls for economic status (i.e., eligibility for the federal free or reduced lunch program) were analyzed. Three separate manuscripts were generated from this dissertation.

Five chapters are included in this journal-ready dissertation. Chapter I included the background of the study, statement of the problem, purpose of the study, significance of the study, definition of terms, theoretical framework, delimitations, limitations, assumptions, and outline of the proposed journal-ready dissertation. The framework, results, and analysis for the first study on mobility as it relates to Grade 6 academic achievement were presented in Chapter II. The framework, results, and analysis for the second study on mobility as it is related to Grade 7 academic achievement were introduced in Chapter III. The framework, results, and analysis for the third study about mobility as related to Grade 8 academic achievement were discussed in Chapter IV. Results from the three studies were compared in Chapter V.

CHAPTER II

MOBILITY AND DIFFERENCES IN READING AND MATHEMATICS ACHIEVEMENT IN TEXAS FOR GRADE 6 STUDENTS

This dissertation follows the style and format of *Research in the Schools (RITS)*.

Abstract

Differences in reading and mathematics achievement of Grade 6 students as a function of mobility were examined with and without controls for economic status in this investigation. Data were obtained from the Texas Education Agency Public Education Information Management System for the 2003-2004 through the 2007-2008 school years. Statistically significant differences were revealed in reading and mathematics test scores as a function of student mobility, both when controlling for and not controlling for economic status. Mobile students had statistically significantly lower reading and mathematics test scores than did non-mobile students for all 6 school years. Implications for policy and practice and suggestions for future research were made.

Keywords: Mobility, academic achievement, poverty, Grade 6

MOBILITY AND DIFFERENCES IN READING AND MATHEMATICS ACHIEVEMENT IN TEXAS FOR GRADE 6 STUDENTS

The transition from elementary school to middle school is a phenomenon approximately 88% of public school students experience (National Middle School Association, 2010). This transition has been linked to negative academic results for students (Bellmore, 2011) or at least causes students to experience an academic plateau (Lee, 2010). Transition from one school to another can be either due to structure in areas that have separate elementary and middle school campuses, residential mobility, or school choice (e.g., Hartman, 2003; Strand & Demie, 2007; Vail, 1996). Mobility, identified by students changing schools not due to school structure, has been documented to have negative effects on students changing schools, however, debate exists whether these negative effects are significant when controlling for other variables, or persist over time (e.g., Alexander, Entwisle, & Dauber, 1996; Gasper, DeLuca, & Estacion, 2010; Ingersoll, Scamman, & Eckerling, 1989; Nelson, Simoni, & Adelman, 1996).

Reasons for Mobility

Students change schools during the school year for many reasons. A parent’s job loss, a parent’s promotion at work, a death in the family, divorce, or remarriage are family structure factors that may cause a residence change leading to student mobility (e.g., Hartman, 2003; Strand & Demie, 2007). Schools may also create student mobility through policies allowing for or requiring students to change schools due to behavior. Discipline events such as drug use and weapon possession often require placement at an alternative campus. Students in California have a high rate, 30%, of school-encouraged moves (Rumberger, 2003). In some areas, parents can choose what school their child attends. School vouchers, magnet programs, charter schools, inter- and intra-district transfer policies allow parents and students to choose what school their students attend (e.g., Rumberger, 2003, Strand & Demie, 2007).

Student Effects of Mobility

Student mobility initiated by parent choice, or school encouraged mobility may be undertaken with the intention to provide the student with a better environment to succeed, though the negative effects of school mobility have been documented, debate exists regarding the persistence of the negative effects (e.g., Alexander et al., 1996; Borque, 2009). Mobile students have shown decreased academic achievement (e.g., Audette, Algozzine, & Warden, 1993; Reynolds, Chen, & Hebers, 2009). Researchers (e.g., Ellickson & McGugian, 2000; Holand, Kaplan, & Davis, 1974; Lovell & Isaacs, 2008) have also provided documentation regarding the increased propensity of mobile students for problematic behavior. Although students with poor behavior and reduced academic achievement have an increased chance of dropping out of school, evidence indicates that mobile students drop out at an even higher rate (e.g., Gasper, De Luca, & Estacion, 2012). Mobile students participate in extracurricular activities at a lower rate, which is a known protective factor against dropping out of school (Haynie, South, & Bose, 2006).

Solutions for Mobile Students Issues

School leaders have attempted to address the issues faced by mobile students in different ways. Some schools have modified particular policies that require mobility, such as rigid zoning policies requiring students to change schools when their residence changes (e.g., Kerbow, Azcoita, & Buell, 2003). A few districts have extended the courtesy of a lenient policy to provide transportation beyond a school's established zones to prevent mobility (James & Lopez, 2003). Parent initiated moves have been reduced by building better relationships, providing social services (Kerbow et al., 2003) at the school, and providing information to parents about the possible negative effects of mid-year moves (Bradshaw, Sudhinaraset, Mmari, & Blum, 2010).

Not all mobility can be prevented or delayed until summer break. Schools most effective at addressing mobile students' challenges provide support for mobile students in addition to attempting to prevent student mobility (Kerbow et al., 2003). One principal challenge facing mobile students and schools the students move into is the ability of the receiving school to assess the student's academic, and other, needs accurately and efficiently (Hartman, 2003). Areas where regular patterns of high mobility rates have been identified school officials work to share information among schools and districts in the most efficient way possible (Branz-Spall, Rosenthal, & Wright, 2003). Other schools with high mobility rates have implemented procedures to ensure the immediate assessment of students when the student enrolls rather than waiting on assessment data (Bradshaw et al., 2010). Also recommended has been that schools with known patterns of mobility, such as military base schools, align curriculum so that students entering one school do not miss instruction due to differing curricular sequences (Smrekar & Owens, 2003).

Students' attachment to their school can be a protective factor against negative behaviors and dropping out of school, however, mobile students often have difficulty connecting to new schools (Schaller, 1975). Schools finding ways to foster the growth of school connectedness can improve the opportunities of mobile students to be successful (Scherrer, 2013). Student ambassadors assigned to help show new students around and support new students connections to the school have been indicated as an effective program for schools with high mobility (Bradshaw et al., 2010). Regular meetings with school counselors and follow-up meetings with families enrolling mid-year are also regarded as best practices to support mobile students (Smith, Fein, & Paine, 2008).

Purpose of the Study

The purpose of this study was to examine the relationship between mobility and academic achievement for Texas Grade 6 students while controlling for and not controlling for economic status. Specifically, academic achievement measured by the Texas Assessment of Academic Achievement (TAKS) Reading and Mathematics tests was analyzed while controlling for and not controlling for economic status (i.e., eligibility for the federal free or reduced price lunch program). Six years of statewide data were analyzed from Texas Grade 6 students to determine the persistence of differences between the academic achievement of mobile and non-mobile students.

Significance of the Study

Available research on mobility has produced varying results due to varying methods and controls. Provided in this empirical investigation is clarification of the relationship and persistence of the relationship between mobility and academic achievement. Research previously undertaken on student mobility has lacked sufficient power due to small sample size or adequate controls for confounding variables. Data for this study were collected for all students who took the TAKS Reading and Mathematics tests in Grade 3 and Grade 6 during the 2003 and 2006 school years; 2004 and 2007 school years; and the 2005 and 2008 school years, respectively providing a sample size capable of producing credible statistical power.

Statement of the Problem

Mobility has been identified to be connected, at least, to several factors contributing to poor school outcomes (e.g., Audete et al., 1993; Lovell & Isaacs, 2008). Mobility by the definition used in this study involves changing schools (Texas Education Agency, 2012). Whereas some school changes are due to residential mobility (e.g., Rumberger, 2003), some changes are caused by the structure of schools (National Middle School Association, 2010). For the purposes of this study mobility occurred during the school year and would not be due to school structure. The negative effects of mobility may be caused by the difference in buildings and organizational structures inherent to these buildings (Belmore, 2011; Lee, 2010). Mobility has been associated with negative academic (e.g., Audette et al., 1993; Lovell & Isaacs, 2008) and behavioral (e.g., Ellickson & McGuigan, 2000; Lovell & Isaacs, 2008) outcomes. Disagreement exists among researchers (e.g., Bourque, 2009; Gasper et al., 2012) who regard the effects of mobility as lingering and researchers (e.g., Hanushek, Kain, & Rivkin, 2004, 2009) who claim the effects are diminished over a short period of stability or when controls for prior academic achievement and demographic factors are controlled for (e.g., Heinlein & Shinn, 2000; Strand & Demie, 2007).

Differences in samples create some difficulty tracking mobile students. Researchers (e.g., Bourque, 2009; Heinlein & Shinn, 2000) often are only able to track students at one point in time or within a local school system. Some researchers (e.g., Hanushek et al., 2004, 2009) who have controlled for demographic factors and prior academic achievement have only noted initial negative effects of mobility, whereas other researchers (Haynie et al., 2006) have determined the negative effects persist at least two years. Data were analyzed in this investigation regarding the effects of mobility while controlling for and not controlling for economic status of Grade 6 students in the state of Texas.

Research Questions

The research questions addressed in this study were: (a) What is the relationship of student mobility to Grade 6 reading achievement when controlling for economic status?; (b) What is the relationship of student mobility to Grade 6 reading achievement when not controlling for economic status?; (c) What is the relationship of student mobility to Grade 6 mathematics achievement when controlling for economic status?; and (d) What is the relationship of student mobility to Grade 6 mathematics achievement when not controlling for economic status? These research questions were repeated for each of the 6 school years of data (i.e., 2002-2003 through the 2007-2008) analyzed.

Method

Research Design

For this article, a non-experimental research design (Johnson & Christensen, 2008) was used. Non-experimental research designs are characterized by a lack of manipulation of the independent variable. In the design of this research study, particularly the use of archival data, the independent variable of student mobility, has already occurred. One variable, economic status as indicated by qualification for the federal free and reduced lunch program, was controlled for in two of the four research questions. The dependent variables of academic achievement were measured by student performance on the TAKS Reading and Mathematics tests. The independent variable in this investigation for all research questions was mobility, as defined by the Texas

Education Agency, enrolled at a campus less than 83% of the school year (Texas Education Agency, 2012).

Participants and Instrumentation

Archival data from the 2003 through the 2008 school years were obtained from the Texas Education Agency Public Education Information Management System for all Grade 6 students. The specific focus of this research study was on differences in academic achievement between mobile and non-mobile students in Grade 6 in Texas. Mobility will be defined by the TEA definition; students enrolled for less than 83% of the school year (Texas Education Agency, 2012). Economic status was also utilized as a control variable. Texas Education Agency defines economic disadvantage as qualifying for the federal free and reduced lunch program or other forms of public assistance (Texas Education Agency, 2012). Data for 295,294 Grade 6 students were collected from the 2002-2003, 289,132 Grade 6 students from the 2003-2004 school year, 300,206 Grade 6 students from the 2004-2005 school year, 291,801 Grade 6 students from the 2005-2006 school year, 304,841 Grade 6 students from the 2006-2007 school year, and 328,371 Grade 6 students from the 2007-2008 school year. Grade 6 TAKS Reading and Mathematics test raw scores from the 2003, 2004, 2005, 2006, 2007, and 2008 school years were analyzed as dependent variables for this investigation. Readers can examine the technical digest for each of the test administrations, which can be accessed through a Public Information Request to the Texas Education Agency, for a more detailed explanation.

Data Analysis

A Multivariate Analysis of Covariance (MANCOVA) statistical analysis was used to address the first and third research questions, in which student economic status was used as a covariate. Underlying assumptions for normality of the dependent variables (i.e., Grade 6 TAKS Reading and Mathematics raw scores) were checked prior to conducting the statistical analysis, as well as the Levene's Test of Equality of Error Variances. Although some of the underlying assumptions were not met, Field (2009) contends MANCOVA procedures are robust enough to produce trustworthy results even when the underlying assumptions have not been met.

To address the second and fourth research questions, in which controls were not present for economic status, a Multivariate Analysis of Variance (MANOVA) statistical analysis was used. Similar to the MANCOVA assumptions not all being met, some of the underlying assumptions for the MANOVAs were not met. Field (2009), however, contends that MANOVA procedures are sufficiently robust enough to produce trustworthy results even when all of its underlying assumptions have not been met.

Results

Results of the statistical analysis for Grade 6 mobile and non-mobile students will be reported by TAKS subject area subtest (i.e., Reading and Mathematics). Results of each test will be reported in chronological order. Research questions b and d require a MANOVA procedure and are reported first. Research questions a and c require a MANCOVA procedure so that economic status can be used as a covariate and are reported second. Data from the 2002-2003 through the 2007-2008 school years were analyzed herein.

With respect to the 2002-2003 school year, the MANOVA revealed a statistically significant difference between mobile and non-mobile Grade 6 students in their overall achievement, Wilks' $\Lambda = 1.0$, $p < .001$, partial $\eta^2 = .002$. Follow-up Analysis of Variance (ANOVA) procedures also yielded statistically significant differences between mobile and non-mobile Grade 6 students in their TAKS Reading performance, $F(1, 217467) = 298.22$, $p < .001$, partial $\eta^2 = .001$ and in their TAKS Mathematics performance, $F(1, 217467) = 464.31$, $p < .001$, partial $\eta^2 = .001$.

As noted previously, student economic status was used as a covariate in research questions a and c. For these research questions, a MANCOVA statistical procedure was calculated. A statistically significant difference was yielded on student overall achievement, Wilks' $\Lambda = 1.0$, $p < .001$, partial $\eta^2 = .002$, trivial effect size, as a function of student mobility, and as a function of student poverty, Wilks' $\Lambda = .83$, $p < .001$, partial $\eta^2 = .17$, large effect size (Cohen, 1988). Readers should note the strong influence of poverty on student achievement in this analysis. A statistically significant difference was present between the covariate of economic status and TAKS Reading scores, $F(1, 217467) = 41512.20$, $p < .001$, $r = .40$, and between the covariate of economic status and TAKS Mathematics scores, $F(1, 217467) = 30825.74$, $p < .001$, $r = .35$. After controlling for the effect of economic status, a statistically significant effect of mobility on TAKS reading scores remained, $F(1, 217464) = 171.23$, $p < .001$, partial $\eta^2 = .001$. A statistically significant effect of mobility on TAKS Mathematics scores also remained after controlling for economic status, $F(1, 217464) = 326.55$, $p < .001$, partial $\eta^2 = .001$.

Non-mobile students had higher average TAKS Reading and TAKS Mathematics test scores in the 2002-2003 school year than their mobile counterparts. These results remained even when controlling for economic status. Cohen's *d* indicated a small effect size for both reading (i.e., 0.27) and mathematics (i.e., 0.35; Cohen, 1988). The average TAKS Reading test raw score for mobile students was 2.35 points lower than the average TAKS Reading test raw score for non-mobile students. With respect to the TAKS Mathematics exam, the average raw score for mobile students was 3.25 points lower than the average raw score for non-mobile students. Delineated in Table 2.1 are the descriptive statistics for Grade 6 TAKS Reading and Mathematics scores by mobility and economic status for the 2002-2003 school year.

Insert Table 2.1 about here

With respect to research questions b and d for the 2003-2004 school year, the MANOVA revealed a statistically significant difference between mobile and non-mobile Grade 6 students in their overall achievement, Wilks' $\Lambda = 1.0$, $p < .001$, partial $\eta^2 = .004$, trivial effect size (Cohen, 1988). Follow-up ANOVA procedures also yielded statistically significant differences between mobile and non-mobile Grade 6 students in their TAKS Reading performance, $F(1, 220197) = 567.16$, $p < .001$, partial $\eta^2 = .003$ and in their TAKS Mathematics performance, $F(1, 220197) = 745.72$, $p < .001$, partial $\eta^2 = .003$.

As noted previously, student economic status was used as a covariate in research questions a and c. For these research questions, a MANCOVA statistical procedure was calculated. A statistically significant difference was yielded on student overall achievement, Wilks' $\Lambda = 1.0$, $p < .001$, partial $\eta^2 = .002$, trivial effect size, as a function of student mobility, and as a function of student poverty, Wilks' $\Lambda = .83$, $p < .001$, partial $\eta^2 = .17$, large effect size. Similar to the previous year, poverty had a large influence on student achievement. A statistically significant difference was present between the covariate of economic status and TAKS Reading scores, $F(1, 220197) = 39870.40$, $p < .001$, $r = .39$, and between the covariate of economic status and TAKS Mathematics scores, $F(1, 220197) = 34454.16$, $p < .001$, $r = .37$. After controlling for the effect of economic status, a statistically significant effect of mobility on TAKS reading scores remained, $F(1,220197) = 293.04$, $p < .001$, partial $\eta^2 = .001$. A statistically significant effect of mobility on TAKS Mathematics scores also remained after controlling for economic status, $F(1, 220197) = 450.10$, $p < .001$, partial $\eta^2 = .002$.

Similar to the previous year, non-mobile students had higher average TAKS Reading and Mathematics test scores in 2004 than their mobile counterparts. These results remained even when controlling for economic status. Cohen's *d* indicated a small effect size for both reading (i.e., 0.38) and mathematics (i.e., 0.44; Cohen, 1988). The average TAKS Reading test raw score for mobile students was 2.70 points lower than the average TAKS Reading test raw score for non-mobile students. With respect to the TAKS Mathematics exam, the average raw score for mobile students was 3.78 points lower than the average raw score for non-mobile students. Delineated in Table 2.2 are the descriptive statistics for Grade 6 TAKS Reading and Mathematics scores by mobility and economic status for the 2003-2004 school year.

Insert Table 2.2 about here

Concerning the 2004-2005 school year for research questions b and d, the MANOVA revealed a statistically significant difference between mobile and non-mobile Grade 6 students in their overall achievement, Wilks' $\Lambda = 1.0$, $p < .001$, partial $\eta^2 = .003$, trivial effect size (Cohen, 1988). Follow-up ANOVA procedures also yielded statistically significant differences between mobile and non-mobile Grade 6 students in their TAKS Reading performance, $F(1, 219820) = 489.15$, $p < .001$, partial $\eta^2 = .002$ and in their TAKS Mathematics performance, $F(1, 219820) = 583.26$, $p < .001$, partial $\eta^2 = .003$.

As noted previously, student economic status was used as a covariate in research questions a and c. For these research questions, a MANCOVA statistical procedure was calculated. A statistically significant difference was yielded on student overall achievement, Wilks' $\Lambda = 1.0$, $p < .001$, partial $\eta^2 = .002$, trivial effect size, as a function of student mobility, and as a function of student poverty, Wilks' $\Lambda = .84$, $p < .001$, partial $\eta^2 = .16$, large effect size (Cohen, 1988). Congruent with the previous two years, poverty had a large influence on student achievement. A statistically significant difference was present between the covariate of economic status and TAKS Reading scores, $F(1, 219779) = 38320.66$, $p < .001$, $r = .39$, and between the covariate of economic status and TAKS Mathematics scores, $F(1, 219779) = 31989.44$, $p < .001$, $r = .36$. After controlling for the effect of economic status, a statistically significant effect of mobility on TAKS reading score remained, $F(1, 219779) = 253.70$, $p < .001$, partial $\eta^2 = .001$. A statistically significant effect of mobility on TAKS Mathematics scores also remained after controlling for economic status, $F(1, 219779) = 342.50$, $p < .001$, partial $\eta^2 = .002$.

Similar to the two previous years, non-mobile students had higher average TAKS

Reading and Mathematics test scores in the 2004-2005 school year than their mobile counterparts. These results remained even when controlling for economic status. Cohen's *d* indicated a small effect size for both reading (i.e., 0.34) and mathematics (i.e., 0.38; Cohen, 1988). The average TAKS Reading test raw score for mobile students was 2.45 points lower than the average TAKS Reading test raw score for non-mobile students. With respect to the TAKS Mathematics exam, the average raw score for mobile students was 3.43 points lower than the average raw score for non-mobile students. Revealed in Table 2.3 are the descriptive statistics for Grade 6 TAKS Reading and Mathematics scores by mobility and economic status for the 2004-2005 school year.

Insert Table 2.3 about here

With respect to research questions b and d for the 2005-2006 school year, the MANOVA revealed a statistically significant difference between mobile and non-mobile Grade 6 students in their overall achievement, Wilks' $\Lambda = .99$, $p < .001$, partial $\eta^2 = .007$, trivial effect size (Cohen, 1988). Follow-up ANOVA procedures also yielded statistically significant differences between mobile and non-mobile Grade 6 students in their TAKS Reading performance, $F(1, 216839) = 949.20$, $p < .001$, partial $\eta^2 = .004$ and in their TAKS Mathematics performance, $F(1, 216839) = 1359.64$, $p < .001$, partial $\eta^2 = .006$.

As noted previously, student economic status was used as a covariate in research questions a and c. For these research questions, a MANCOVA statistical procedure was calculated. A statistically significant difference was yielded on student overall achievement, Wilks' $\Lambda = 1.0$, $p < .001$, partial $\eta^2 = .005$, trivial effect size, as a function of student mobility, and as a function of student poverty, Wilks' $\Lambda = .85$, $p < .001$, partial $\eta^2 = .15$, large effect size (Cohen, 1988). Congruent with the previous three years, poverty had a large influence on student achievement. A statistically significant difference was present between the covariate of economic status and TAKS Reading scores, $F(1, 216837) = 33816.57$, $p < .001$, $r = .37$, and between the covariate of economic status and TAKS Mathematics scores, $F(1, 216837) = 27457.64$, $p < .001$, $r = .34$. After controlling for the effect of economic status, a statistically significant effect of mobility on TAKS reading scores remained, $F(1, 216837) = 578.92$, $p < .001$, partial $\eta^2 = .003$. A statistically significant effect of mobility on TAKS Mathematics scores also remained after controlling for economic status, $F(1, 216837) = 957.45$, $p < .001$, partial $\eta^2 = .004$.

Similar to the previous three years, non-mobile students had higher average TAKS Reading and Mathematics test scores in the 2005-2006 school year than their mobile counterparts. These results remained even when controlling for economic status. Cohen's *d* indicated a small effect size for reading (i.e., 0.42) and a moderate effect size for mathematics (i.e., 0.52; Cohen, 1988). The average TAKS Reading test raw score for mobile students was 2.76 points lower than the average TAKS Reading test raw score for non-mobile students. With respect to the TAKS Mathematics exam, the average raw score for mobile students was 4.32 points lower than the average raw score for non-mobile students. Table 2.4 contains the descriptive statistics for Grade 6 TAKS Reading and Mathematics scores by mobility and economic status for the 2005-2006 school year.

Insert Table 2.4 about here

Regarding the 2006-2007 school year for research questions b and d, the MANOVA revealed a statistically significant difference between mobile and non-mobile Grade 6 students in their overall achievement, Wilks' $\Lambda = 1.0$, $p < .001$, partial $\eta^2 = .004$, trivial effect size (Cohen, 1988). Follow-up ANOVA procedures also yielded statistically significant differences between mobile and non-mobile Grade 6 students in their TAKS Reading performance, $F(1, 232101) = 566.73$, $p < .001$, partial $\eta^2 = .002$ and in their TAKS Mathematics performance, $F(1, 232101) = 880.30$, $p < .001$, partial $\eta^2 = .004$.

As noted previously, student economic status was used as a covariate in research questions a and c. For these research questions, a MANCOVA statistical procedure was calculated. A statistically significant difference was yielded on student overall achievement, Wilks' $\Lambda = 1.0$, $p < .001$, partial $\eta^2 = .003$, trivial effect size, as a function of student mobility, and as a function of student poverty, Wilks' $\Lambda = .87$, $p < .001$, partial $\eta^2 = .13$, large effect size. Congruent with the previous four years, poverty had a large influence on student achievement. A statistically significant difference was present between the covariate of economic status and TAKS Reading scores, $F(1, 232088) = 30818.25$, $p < .001$, $r = .34$, and between the covariate of economic status and TAKS Mathematics scores, $F(1, 232088) = 26718.87$, $p < .001$, $r = .33$. After controlling for the effect of economic status, a statistically significant effect of mobility on TAKS reading scores remained, $F(1, 232088) = 320.62$, $p < .001$, partial $\eta^2 = .001$. A statistically significant effect of mobility on TAKS Mathematics scores also remained after controlling for economic status, $F(1, 232088) = 596.83$, $p < .001$, partial $\eta^2 = .003$.

Similar to the previous four years, non-mobile students had higher average TAKS Reading and Mathematics test scores in the 2006-2007 school year than their mobile counterparts. These results remained even when controlling for economic status. Cohen's *d* indicated a small effect size for both reading (i.e., 0.34) and mathematics (i.e., 0.44; Cohen, 1988). The average TAKS Reading test raw score for mobile students was 2.13 points lower than the average TAKS Reading test raw score for non-mobile students. With respect to the TAKS Mathematics exam, the average raw score for mobile students was 3.76 points lower than the average raw score for non-mobile students. Delineated in Table 2.5 are the descriptive statistics for Grade 6 TAKS Reading and Mathematics scores by mobility and economic status for the 2006-2007 school year.

Insert Table 2.5 about here

With respect to research questions b and d for the 2007-2008 school year, the MANOVA revealed a statistically significant difference between mobile and non-mobile Grade 6 students in their overall achievement, Wilks' $\Lambda = 1.0$, $p < .001$, partial $\eta^2 = .003$, trivial effect size (Cohen, 1988). Follow-up ANOVA procedures also yielded statistically significant differences between mobile and non-mobile Grade 6 students in their TAKS Reading performance, $F(1, 239025) = 407.31$, $p < .001$, partial $\eta^2 = .002$ and in their TAKS Mathematics performance, $F(1, 239024) = 656.89$, $p < .001$, partial $\eta^2 = .003$.

As noted previously, student economic status was used as a covariate in research questions a and c. For these research questions, a MANCOVA statistical procedure was calculated. A statistically significant difference was yielded on student overall achievement, Wilks' $\Lambda = 1.0$, $p < .001$, partial $\eta^2 = .002$, trivial effect size, as a function of student mobility, and as a function of student poverty, Wilks' $\Lambda = .87$, $p < .001$, partial $\eta^2 = .13$, large effect size. Congruent with the previous five years, poverty had a large influence on student achievement. A statistically significant difference was present between the covariate of economic status and TAKS Reading scores, $F(1, 239019) = 32033.92$, $p < .001$, $r = .35$, and between the covariate of economic status and TAKS Mathematics scores, $F(1, 239019) = 26601.54$, $p < .001$, $r = .32$. After controlling for the effect of economic status, a statistically significant effect of mobility on TAKS reading scores remained, $F(1, 239019) = 227.33$, $p < .001$, partial $\eta^2 = .001$. A statistically significant effect of mobility on TAKS Mathematics scores also remained after controlling for economic status, $F(1, 239019) = 446.34$, $p < .001$, partial $\eta^2 = .002$.

Similar to the previous five years, non-mobile students had higher average TAKS Reading and TAKS Mathematics test scores in the 2007-2008 school year than their mobile counterparts. These results remained even when controlling for economic status. Cohen's *d* indicated a small effect size for both reading (i.e., 0.32) and mathematics (i.e., 0.42; Cohen, 1988). The average TAKS Reading test raw score for mobile students was 2.01 points lower than the average TAKS Reading test raw score for non-mobile students. With respect to the TAKS Mathematics exam, the average raw score for mobile students was 3.58 points lower than the average raw score for non-mobile students.

Table 2.6 contains the descriptive statistics for Grade 6 TAKS Reading and Mathematics scores by mobility and economic status for the 2007-2008 school year.

Insert Table 2.6 about here

Discussion

In this investigation, the relationship between student mobility and academic achievement for Grade 6 students was examined, with and without controlling for economic status, for the 2002-2003 through the 2007-2008 school years. Data were obtained from the Texas Education Agency Public Education Information Management System for all Texas Grade 6 students who were in the accountability subset for a school district. In each school year, statistically significant results were present, both when controlling for economic status and when not controlling for economic status. Following the statistical analyses, trends for each subject area test were determined.

Across the six school years of statewide data that were analyzed herein, non-mobile students had higher average TAKS Reading test scores than mobile students in each school year. The difference in reading scores between non-mobile students and mobile students ranged from 2.01 points to 2.76 points. To evaluate the relative difference between these two groups across the school years, a Cohen's *d* was calculated for each year. These values are delineated in Table 2.7 and range from a high of 0.42 to a low of 0.27. As such, these effect sizes were in the small range (Cohen, 1988).

Insert Table 2.7 about here

Differences between non-mobile and mobile students were larger for the TAKS Mathematics assessment than for the TAKS Reading test. Across the six school years of data analyzed in this study, non-mobile students had higher average TAKS Mathematics raw scores than did mobile students in each school year. Average differences between non-mobile students and mobile students ranged from 3.09 points to 3.78 points. To determine the practical importance of these differences, a Cohen's *d* was calculated for each school year. Delineated in Table 2.7 are the values for these Cohen *d*s, which ranged from 0.35 to 0.52. Effect sizes below 0.50 were small whereas the effect size values at 0.50 or above were moderate (Cohen, 1988).

Implications for Policy and Practice

The State of Texas calculates the mobility rate of a school campus or a school district as the number of students who spend less than 83% of the school year at a particular campus or school district divided by the total number of students who are ever enrolled in that campus or school district (Texas Education Agency, 2012). The campus's accountability subset is defined as students who are enrolled in a particular campus or school district on the last Friday in October (i.e., snapshot day) and take the TAKS tests in the same campus or school district (Texas Education Agency, 2012). Although the accountability subset may include some mobile students, this definition excludes the most mobile students. Of importance here is that the accountability subset constitutes the student group for whom the campus and school district are held accountable through punitive measures and ratings.

The accountability subset and definitions of what constitutes a mobile student create two classes of mobile students. Mobile students who are mobile at one or more campuses and non-mobile at another campus constitute one class of mobile students. Students who are mobile at all campuses they have been enrolled at constitute a second class of mobile students. This adjustment of the accountability subset takes into account the research literature (e.g., Bourque, 2009) that mobile students do not perform as well as their non-mobile peers. However, some mobile students are still included in the accountability subset (i.e., students who are enrolled on snapshot day and take the TAKS in the same campus or district but are enrolled less than 83% of the school year) of some campuses and school districts. The adjustment by Texas of the accountability subset to exclude the most mobile students appears to be successful as indicated by the extremely small effect sizes between the mobile and non-mobile student groups in this study. Though this policy is effective for mitigating the negative effects of mobile students on campuses and school districts, not accounted for are the negative effects of mobility on individual students.

Connections with Existing Literature

The statistically significant differences between non-mobile students and mobile students in their reading and mathematics performance in each of the six years of data analyzed herein, when controlling for and not controlling for, economic status supports the literature that mobility negatively influences academic achievement (e.g., Bourque, 2009; Haynie et al., 2006; Lovell & Isaacs, 2008; Reynolds et al., 2009; Rumberger, 2003). As previously discussed, the definition of mobile students in Texas and the accountability subset create different classes of student mobility. Previously, researchers (e.g., Gasper et al., 2012) have documented the presence of different effects on different types of students. Researchers (e.g., Hanushek et al., 2004, 2009; Kerbow et al., 2003; Smith et al., 2008) have also established that more mobile students (i.e., students who move more frequently) experience greater negative effects The exclusion of the most mobile students from the accountability subset may allow the needs of the most mobile students to be neglected. The unintended consequences of accountability such as this situation have been discussed by researchers (Scherrer, 2013).

Recommendations for Future Research

The effects of mobility on students whose data were not analyzed in this study (i.e., not included in an accountability subset) are not clear. Only 0.05% of the cases in this study were not included in a campus or school district's accountability subset. Many of these students are likely clerical errors and may have been included in an accountability subset. Over 3,000 students per year in Grade 6 were included in the state attendance and enrollment data but their testing data were not present. Delineated in Table 2.8 and Table 2.9 are sample sizes and numbers of cases included and excluded due to missing scores by mobility. Further research studies are warranted on students who are mobile and whose data are not present in the accountability subset for any campus or school district.

Insert Tables 2.8 and 2.9 about here

Prior researchers (e.g., Heinlein & Shinn, 2000) have also indicated that prior academic achievement may influence the effect of mobility. Obtaining a data set with prior academic achievement data for students who change schools frequently is difficult. The Texas data obtained and analyzed herein might include a substantial number of these students and their prior academic achievement, however connecting student data across moves is difficult to accomplish. Improvements in tracking students who change schools have occurred in the past several years. In future years, as tracking improvements have been improved, more data may become available to control for student prior academic achievement. Such an analysis would provide a more rigorous analysis of the influence of mobility on student achievement.

Researchers are encouraged to examine student demographic characteristics to determine whether mobility affects all students in the same manner or whether differences exist by student demographic characteristic. That is, is the academic achievement of boys and girls influenced to the same degree by mobility? Other characteristics that could be analyzed would be ethnicity/race, at-risk status, and English Language Learner status. Finally, a recommendation is made for researchers to examine whether mobility that occurs at different grade levels has a differential influence on student achievement.

Summary

Mobility is an issue that affects many students. Debate exists, however, regarding the difference between the negative effects of mobility and the negative effects of economic status that often accompanies mobility. Texas has implemented accountability measures to mitigate the effects of student mobility on campuses and districts. Data in this study indicate though Grade 6 mobile students still perform below their non-mobile counterparts the students included in campus and district accountability subsets difference is small. Research related to other middle level grades (i.e., Grade 7 and Grade 8) and related to students not included in the accountability subset is needed to illuminate this issue further.

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Table 2.1

Descriptive Statistics for Grade 6 TAKS Reading and Mathematics for Mobile and Non-Mobile Students for the 2002-2003 School Year

TAKS Reading and Mathematics by Mobility Status	*n*	*M*	*SD*
Reading			
Non-Mobile	213,992	31.40	7.95
Mobile	3,840	29.17	8.42
Mathematics			
Non-Mobile	213,992	31.56	8.80
Mobile	3,840	28.47	8.95

Table 2.2

Descriptive Statistics for Grade 6 TAKS Reading and Mathematics for Mobile and Non-Mobile Students for the 2003-2004 School Year

TAKS Reading and Mathematics by Mobility Status	*n*	*M*	*SD*
Reading			
Non-Mobile	216,292	32.72	7.02
Mobile	3,905	30.02	7.37
Mathematics			
Non-Mobile	216,292	32.32	8.57
Mobile	3,905	28.54	8.55

Table 2.3

Descriptive Statistics for Grade 6 TAKS Reading and Mathematics for Mobile and Non-Mobile Students for the 2004-2005 School Year

TAKS Reading and Mathematics by Mobility Status	*n*	*M*	*SD*
Reading			
Non-Mobile	215,863	33.50	6.88
Mobile	3,916	31.05	7.56
Mathematics			
Non-Mobile	215,863	34.17	8.81
Mobile	3,916	30.75	9.29

Table 2.4

Descriptive Statistics for Grade 6 TAKS Reading and Mathematics for Mobile and Non-Mobile Students for the 2005-2006 School Year

TAKS Reading and Mathematics by Mobility Status	*n*	*M*	*SD*
Reading			
Non-Mobile	212,451	35.02	5.84
Mobile	4,388	32.26	7.23
Mathematics			
Non-Mobile	212,451	35.76	7.66
Mobile	4,388	31.44	8.89

Table 2.5

Descriptive Statistics for Grade 6 TAKS Reading and Mathematics for Mobile and Non-Mobile Students for the 2006-2007 School Year

TAKS Reading and Mathematics by Mobility Status	*n*	*M*	*SD*
Reading			
Non-Mobile	227,948	35.44	5.73
Mobile	4,513	33.30	6.93
Mathematics			
Non-Mobile	227,948	35.86	8.10
Mobile	4,153	32.09	9.04

Table 2.6

Descriptive Statistics for Grade 6 TAKS Reading and Mathematics for Mobile and Non-Mobile Students for the 2007-2008 School Year

TAKS Reading and Mathematics by Mobility Status	*n*	*M*	*SD*
Reading			
Non-Mobile	235,680	35.85	5.72
Mobile	3,345	33.84	6.97
Mathematics			
Non-Mobile	235,680	36.60	8.00
Mobile	3,345	33.02	9.19

Table 2.7

Cohen's d for Grade 6 TAKS Reading and Mathematics Differences Between Mobile and Non-Mobile Students for the 2002-2003 Through the 2007-2008 School Years

School Year and TAKS Test	*d*	Range	Lowest Performing Group
2002-2003			
Reading	0.27	Small	Mobile
Mathematics	0.35	Small	Mobile
2003-2004			
Reading	0.38	Small	Mobile
Mathematics	0.44	Small	Mobile
2004-2005			
Reading	0.34	Small	Mobile
Mathematics	0.38	Small	Mobile
2005-2006			
Reading	0.42	Small	Mobile
Mathematics	0.52	Moderate	Mobile
2006-2007			
Reading	0.34	Small	Mobile
Mathematics	0.44	Small	Mobile
2007-2008			
Reading	0.32	Small	Mobile
Mathematics	0.42	Small	Mobile

Table 2.8

Sample Group Sizes for Grade 6 Included Students

Year	Total Cases In Data Set	Included			
		Mobile		Not-Mobile	
		Accountability Subset	Non Accountability Subset	Accountability Subset	Non Accountability Subset
2003	295,294	3,748	92	213,984	8
2004	289,132	3,820	85	216,292	0
2005	300,206	3,801	117	215,897	5
2006	291,801	4,260	128	212,448	3
2007	304,841	4,055	98	227,944	4
2008	328,371	3,256	89	235,678	2

Table 2.9

Sample Group Sizes for Grade 6 Not Included Students

Year	Total Cases In Data Set	Not Included			
		Mobile		Not-Mobile	
		Accountability Subset	Non Accountability Subset	Accountability Subset	Non Accountability Subset
2003	295,294	2,277	12,905	61,566	714
2004	289,132	2,179	12,381	62,837	538
2005	300,206	2,363	12,619	65,022	382
2006	291,801	2,371	12,670	59,612	309
2007	304,841	2,103	12,460	57,940	237
2008	328,371	2,201	13,808	73,066	271

CHAPTER III

MOBILITY AND DIFFERENCES IN READING, MATHEMATICS, AND WRITING ACHIEVEMENT IN TEXAS FOR GRADE 7 STUDENTS

This dissertation follows the style and format of *Research in the Schools (RITS)*.

Abstract

Differences in reading, mathematics, and writing achievement of Grade 7 students as a function of mobility were examined with and without controls for economic status in this investigation. Data were obtained from the Texas Education Agency Public Education Information Management System for the 2002-2003 through the 2007-2008 school years. Statistically significant differences were revealed in reading, mathematics, and writing test scores as a function of student mobility, both when controlling for and not controlling for economic status. Mobile students had statistically significantly lower reading, mathematics, and writing test scores than did non-mobile students for all 6 school years. Implications for policy and practice and suggestions for future research were made.

Keywords: Mobility, academic achievement, poverty, Grade 7, Texas

MOBILITY AND DIFFERENCES IN READING, MATHEMATICS, AND WRITING ACHIEVEMENT IN TEXAS FOR GRADE 7 STUDENTS

Families in the United States change residences frequently and for a multitude of reasons. The United States has been considered one of the most mobile countries in the industrialized world (Rumberger, 2003). Some mobility may be for preference, others for economic reasons. A family may move for a new job opportunity or due to a job loss. Families may move to be nearer extended family or other resources. Families may move due to new marriage or a divorce (Hartman 2003). Most moves, however, will result in a change of school for children in a family experiencing mobility. These school changes may have negative effects on students. Negative influences of mobility have been documented related to students' behavior (e.g., Gasper, DeLuca, & Estacion, 2010), school persistence (e.g., Haveman & Wolfe, 1994; Ross, 2014), and academics (e.g., Kain & O'Brien, 1998; Smith, Fein, & Paine, 2008); however, the persistence of negative effects of mobility on student academic performance, has not been firmly established (Bourque, 2009; Temple & Reynolds, 1999).

Residential mobility is not the only cause of student mobility. School choice and school encouraged school changes may also cause students to change schools (Gasper et al., 2010). Areas with multiple charter, private, or parochial schools effectively have school choice. Some districts may also have magnet programs and policies allowing school choice. As student status changes or available transportation changes these students may change schools due to their own choice or a school's policy. Parents, students, and school administrators may choose to change a school believing they are making the best choice for the student; however, the long term effects of changing a school mid-year may not be understood.

Student Effects from Mobility

Researchers (e.g., Bourque, 2009; Temple & Reynolds, 1999) disagree on the lingering effects of mobility. Some researchers (e.g., Haynie, South, & Bose, 2006) have documented that negative effects of mobility persist beyond two years after the move. Other researchers (e.g., Strand & Demie; 2007; Temple & Reynolds, 1999) indicated negative effects of mobility are eliminated after a short period of time, when controlling for demographic factors, or when prior academic achievement is considered (e.g., Reynolds, Chen, & Herbers, 2009). At a minimum, mobility is connected to negative effects on behavior (e.g., Gasper et al., 2010), school persistence (e.g., Haveman & Wolfe, 1994; Ross, 2014), and academics (e.g., Kain & O'Brien, 1998; Smith et al., 2008). Mobile students may be less likely to participate in extracurricular activities in which better behavior, academic performance, and a reduced occurrence of school dropout have been documented (e.g., Lovell & Isaacs, 2008; Pribesh & Downey, 1999; Rumberger, Larson, Ream, & Palardy, 1999). Students who move into a school during a school year or at the beginning of a school year but not with a common cohort (e.g., elementary school to junior high school), have also been reported to select a peer group with fewer pro-social behaviors. These poor social influences may lead to the mobile student exhibiting fewer pro-social behaviors (Schaller, 1975; Scherrer, 2013).

Solutions for Mobile Students' Issues

School administrators and policy makers have attempted to address the issues faced by mobile students in several different ways. Programs have been implemented to reduce mobility, allowing students to remain in a particular school for the entire year or longer (James & Lopez, 2003). Programs designed to connect families to the school and provide information to parents have been utilized to encourage parents to delay moves if possible (Franke, Isken, & Para, 2003; Kerbow, Azcoita, & Buell, 2003). In situations where mobility cannot be avoided or delayed, programs have been implemented to reduce the negative effects of mobility on students (Smith et al., 2008).

Programs that allow students flexibility in which school they attend can contribute to student mobility or reduce student mobility. School districts with flexible enrollment policies give students who experience residential mobility the opportunity to remain in the school they began the school year in which can reduce their mobility rate. Students who qualify as homeless are guaranteed this ability under the McKinney-Vento Homeless Education Act (James & Lopez, 2003). Some districts also extended transportation services to students to encourage remaining in the same school for a full school year (Julianelle & Foscarinis, 2003).

Parents and educators alike may not understand the long term effects of student mobility, and therefore may choose to have students change schools when they move can be avoided. Schools in areas with high mobility and a high number of low economic status students have implemented programs designed to connect families to schools. These programs may include programs to provide health services, nutrition services, or summer activity programs (Franke et al., 2003; Smith et al., 2008). Researchers (e.g., Hanushek, Kain, & Rivkin, 2004, 2009) have provided data indicating that moves within a school district do not produce an increase in school quality and have increased negative effects.

By implementing programs targeted towards mobile students, school administrators can reduce the negative effects of mobility when a school change is unavoidable. Mobile students may experience a disjointed curriculum. Gaps in curriculum due to poor alignment between the school the student left and the school the student entered can be addressed through immediate and efficient assessment of students entering a school (Branz-Spall, Rosenthal, & Wright, 2003; Smith et al., 2008; Smrekar & Owens, 2003). Efficient methods of exchanging information regarding incoming students enable students to be placed immediately in to programs to meet their needs, giving teachers needed information about any academic gaps that may exist (Smrekar & Owens, 2003). The common practice of aligning curriculum among buildings within a school district can be extended between school districts to assist mobile students. In areas where regular patterns of mobility exist, curricular alignment between schools has been determined to mitigate the negative academic effects on mobile students (Bradshaw, Sudhinaraset, Mmari, & Blum, 2010; Kerbow et al., 2003; Rumberger, 2003). Students who are attending the schools mobile students enter can also assist students as they enroll. Pairing students with a student ambassador can help students make pro-social peer connections and reduce the disorientation that can come with changing schools (Kerbow et al., 2003; Smrekar & Owens, 2003).

Purpose of the Study

The purpose of this study was to analyze the relationship between student mobility and academic achievement for Grade 7 students in Texas while controlling for and not controlling for economic status (i.e., eligibility for the federal free and reduced lunch program). Specifically, academic achievement was measured by the Grade 7 Texas

Assessment of Knowledge and Skills Reading, Mathematics, and Writing tests. Six school years of Texas statewide data were analyzed to determine the degree to which trends were present in the performance of mobile and non-mobile students.

Significance of the Study

Research undertaken in which the link between academic achievement and student mobility has been investigated has produced varying results due to varying methods and controls. Small sample sizes also reduce the generalizability of many published studies. Data for this study were taken from all students who took the Grade 7 Texas Assessment of Knowledge and Skills tests in 2003 through 2008. This sample provided adequate size to obtain statistically significant results and the ability to control for economic status.

Statement of the Problem

Research undertaken on the subject of student mobility has not produced consistent results (e.g., Bourque, 2009; Temple & Reynolds, 1999). However, researchers (e.g., Bruno & Isken, 1996; Gasper et al., 2010; Ross, 2014) indicate mobility is at least linked to negative school outcomes. Mobility can be caused by multiple factors and can be categorized in various ways including mobility between school years and during school years (Rumberger, 2003). For this empirical investigation, the Texas Education Agency definition of mobility was used. Students who are enrolled in a school for less than 83% of the school year are considered mobile (Texas Education Agency, 2012). Utilizing this definition, most residential moves that occur during the school year were captured. School required moves, school encouraged moves, and mobility related to school choice when the mobility occurs during the school year was also captured.

Students experiencing mobility during the school year may have experienced differences in curriculum, school structures, and school culture, which could have caused a disorienting effect for mobile students (Rumberger, 2003). Frequent mobility could have also caused students to become less connected to the school they attend or prevented them from participating in activities such as extracurricular programs that foster school connectedness (Scherrer, 2013).

Differences in the outcomes of research regarding mobility can be attributed to differences in sampling and controls for confounding variables. In this research study, the negative effects of mobility were investigated while controlling for economic status. Included in the sample were all students who took the Texas Assessment of Knowledge and Skills Reading, Mathematics, and Writing tests in Texas during Grade 7 between the 2003 and 2008 school years. Through obtaining such a large sample size, issues of small sample size encountered when sampling within individual school districts was addressed. This sample size also allowed for controls for economic status.

Research Questions

The three subject areas assessed in the state-mandated tests at Grade 7 were investigated in this study. The research questions related to reading were: (a) What is the relationship of student mobility to Grade 7 reading achievement when controlling for economic status?; and (b) What is the relationship of student mobility to Grade 7 reading achievement when not controlling for economic status? The research questions related to mathematics were: (a) What is the relationship of student mobility to Grade 7 mathematics achievement when controlling for economic status?; and (b) What is the relationship of student mobility to Grade 7 mathematics achievement when not controlling for economic status? Finally, the research questions concerning writing were: (a) What is the relationship of student mobility to Grade 7 writing achievement when controlling for economic status?; and (b) What is the relationship of student mobility to Grade 7 writing achievement when not controlling for economic status? These research questions were repeated for each of the 6 school years of data analyzed.

Method

Research Design

Because archival data were analyzed in this research study, a non-experimental research design was used (Johnson & Christensen, 2008). The independent variable in this study, mobility (i.e., enrollment in a school less than 83% of the school year), had already occurred (Texas Education Agency, 2012). For the purpose of this investigation the Texas Education Agency definition of mobility was utilized. Although the use of archival data precludes random group assignment, the use of archival data allows for a large sample size which produced adequate statistical power. Three dependent variables were utilized in this study: (a) academic achievement in reading, (b) academic achievement in mathematics, and (c) academic achievement in writing. Academic achievement for the purpose of this study was measured by raw scores on the Texas Assessment of Knowledge and Skills Reading, Mathematics, and Writing tests during the Grade 7 year. One control variable, student economic status, was utilized in this study. The Texas Education Agency (2012) definition of economic disadvantage, eligibility for the federal free and reduced lunch program or other public assistance, was utilized in this investigation.

Participants and Instrumentation

The specific focus of this study was on determining the extent to which differences were present in academic achievement between mobile and non-mobile students in Grade 7. To analyze these differences, archival data from the Texas Education Agency Public Education Information Management System for all Grade 7 students during the 2002-2003 to the 2007-2008 school years were collected. This archival dataset included data for 297,292 Grade 7 students during the 2002-2003 school year, 307,871 Grade 7 students during the 2003-2004 school year, 310,928 Grade 7 students during the 2004-2005 school year, 312,137 Grade 7 students during the 2005-2006 school year, 306,237 Grade 7 students during the 2006-2007 school year, and 355,041 Grade 7 students during the 2007-2008 school year.

Grade 7 Texas Assessment of Knowledge and Skills Reading, Mathematics, and Writing Test raw scores from 2003 to 2008 were analyzed as the dependent variables for this study. Readers should examine the technical reports for these tests for specific score validity and score reliability information. These reports are available through a Public Information Request to the Texas Education Agency.

Data Analysis

To address research question (a) for each of the three subjects tested in Texas at Grade 7, a Multivariate Analysis of Covariance (MANCOVA) statistical analysis was utilized. Underlying assumptions of normality and equality of variance for the dependent variables (i.e., Grade 7 Texas Assessment of Knowledge and Skills Reading, Mathematics, and Writing raw scores) were checked. Field (2009) stated, however, even if these assumptions have not been met the MANCOVA procedure is robust enough to provide reliable results. Grade 7 Texas Assessment of Knowledge and Skills Reading, Mathematics, and Writing test raw scores were each used as dependent variables in this study. The mean difference between each comparison was examined to determine the effect of the independent variable on the dependent variable when economic status was controlled.

To address research question (b) for each of the three subjects tested in Texas at Grade 7 a Multivariate Analysis of Variance (MANOVA) statistical analysis was utilized. The MANOVA statistical analysis was utilized due to the presence of multiple dependent variables (i.e., Grade 7 Texas Assessment of Knowledge and Skills Reading, Mathematics, and Writing Test raw scores) and no control variables. Underlying assumptions of normality were checked for the dependent variables as they were in the MANCOVA analysis. Field (2009) supports the use of MANOVA analyses even when the underlying assumptions were not met.

Results

Results of the statistical analysis for Grade 7 mobile and non-mobile students will be reported by TAKS subject area subtest (i.e., Reading, Mathematics, and Writing). Results of each test will be reported in chronological order. Research question a for each subject area required a MANCOVA procedure to consider economic status as a covariate and are reported first. Research question b for each subject area required a MANOVA procedure and are reported second. Data from the 2002-2003 through the 2007-2008 school years were analyzed herein.

As noted previously, student economic status was used as a covariate in research question a for each subject area. For these research questions, a MANCOVA statistical procedure was calculated. A statistically significant difference was yielded on student overall achievement, Wilks' $\Lambda = 1.0$, $p < .001$, partial $\eta^2 = .002$, trivial effect size, as a function of student mobility, and as a function of student poverty, Wilks' $\Lambda = .84$, $p < .001$, partial $\eta^2 = .16$, large effect size (Cohen, 1988). Readers should note the strong influence of poverty on student achievement in this analysis. A statistically significant difference was present between the covariate of economic status and TAKS Reading scores, $F(1, 216894) = 34163.02$, $p < .001$, $r = .37$; between the covariate of economic status and TAKS Mathematics scores, $F(1, 216894) = 33125.11$, $p < .001$, $r = .37$; and between the covariate of economic status and TAKS Writing scores, $F(1, 216894) = 26826.49$, $p < .001$, $r = .33$. After controlling for the effect of economic status, a statistically significant effect of mobility was present for the TAKS Reading scores, $F(1, 216894) = 145.11$, $p < .001$, partial $\eta^2 = .001$ TAKS Mathematics scores, $F(1, 216894) = 175.22$, $p < .001$, partial $\eta^2 = .001$, and for the TAKS Writing scores, $F(1, 216894) = 139.97$, $p < .001$, partial $\eta^2 = .001$.

The MANOVA completed for research question b for each subject area revealed a statistically significant difference between mobile and non-mobile Grade 7 students in their overall achievement, Wilks' $\Lambda = 1.0$, $p < .001$, partial $\eta^2 = .002$, trivial effect size (Cohen, 1988). Follow-up Analysis of Variance (ANOVA) procedures also yielded statistically significant differences between mobile and non-mobile Grade 7 students in their TAKS Reading performance, $F(1, 216895) = 268.38$, $p < .001$, partial $\eta^2 = .001$; in their TAKS Mathematics performance, $F(1, 216895) = 303.78$, $p < .001$, partial $\eta^2 = .001$; and in their TAKS Writing performance, $F(1, 216895) = 205.31$, $p < .001$, partial $\eta^2 = .001$.

Non-mobile students had higher average TAKS Reading, Mathematics, and Writing test scores in the 2002-2003 school year than their mobile counterparts. These results remained even when controlling for economic status. Cohen's *d* indicated a small effect size for reading (i.e., 0.25), mathematics (i.e., 0.28), and writing (i.e., 0.24; Cohen, 1988). The average TAKS Reading test raw score for mobile students was 1.93 points lower than the average TAKS Reading test raw score for non-mobile students. With respect to the TAKS Mathematics exam, the average raw score for mobile students was 2.57 points lower than the average raw score for non-mobile students. Concerning the TAKS Writing exam, the average raw score for mobile students was 1.66 points lower than the average raw score for non-mobile students. Delineated in Table 3.1 are the descriptive statistics for Grade 7 TAKS Reading, Mathematics, and Writing scores by mobility and economic status for the 2002-2003 school year.

Insert Table 3.1 about here

As noted previously, student economic status was used as a covariate in research question a for each subject area for the 2003-2004 school year. For these research questions, a MANCOVA statistical procedure was calculated. A statistically significant difference was yielded on student overall achievement, Wilks' $\Lambda = 1.0$, $p < .001$, partial $\eta^2 = .002$, trivial effect size, as a function of student mobility, and as a function of student poverty, Wilks' $\Lambda = .85$, $p < .001$, partial $\eta^2 = .15$, large effect size (Cohen, 1988). Similar to the previous year, poverty had a large influence on student achievement. A statistically significant difference was present between the covariate of economic status and TAKS Reading scores, $F(1, 226183) = 29858.48$, $p < .001$, $r = .34$; TAKS Mathematics scores, $F(1, 226183) = 32504.23$, $p < .001$, $r = .36$; and TAKS Writing scores, $F(1, 226183) = 29840.14$, $p < .001$, $r = .34$. After controlling for the effect of economic status, a statistically significant effect of mobility was still present for TAKS reading scores, $F(1,226183) = 248.81$, $p < .001$, partial $\eta^2 = .001$; TAKS Mathematics scores, $F(1, 226183) = 391.68$, $p < .001$, partial $\eta^2 = .002$; and for TAKS Writing scores, $F(1, 226183) = 270.35$, $p < .001$, partial $\eta^2 = .001$.

With respect to research question b for each subject area, the MANOVA revealed a statistically significant difference between mobile and non-mobile Grade 7 students in their overall achievement, Wilks' $\Lambda = 1.0$, $p < .001$, partial $\eta^2 = .003$, trivial effect size (Cohen, 1988). Follow-up ANOVA procedures also yielded statistically significant differences between mobile and non-mobile Grade 7 students in their TAKS Reading performance, $F(1, 226183) = 527.65$, $p < .001$, partial $\eta^2 = .002$; in their TAKS Mathematics performance, $F(1, 226183) = 727.09$, $p < .001$, partial $\eta^2 = .003$; and in their TAKS Writing performance, $F(1, 226183) = 556.87$, $p < .001$, partial $\eta^2 = .002$.

Similar to the previous year, non-mobile students had higher average TAKS Reading, Mathematics, and Writing test scores in 2004 than their mobile counterparts. These results remained even when controlling for economic status. Cohen's *d* indicated a small effect size for reading (i.e., 0.33), mathematics (i.e., 0.41), and writing (i.e., 0.35; Cohen, 1988). The average TAKS Reading test raw score for mobile students was 2.65 points lower than the average TAKS Reading test raw score for non-mobile students. Regarding the TAKS Mathematics exam, the average raw score for mobile students was 3.67 points lower than the average raw score for non-mobile students. With respect to the TAKS Writing exam, the average raw score for mobile students was 2.42 points lower than the average raw score for non-mobile students. Delineated in Table 3.2 are the descriptive statistics for Grade 7 TAKS Reading, Mathematics, and Writing scores by mobility and economic status for the 2003-2004 school year.

Insert Table 3.2 about here

Concerning the 2004-2005 school year, student economic status was used as a covariate in research questions a for each subject area. For these research questions, a MANCOVA statistical procedure was calculated. A statistically significant difference was yielded on student overall achievement, Wilks' $\Lambda = 1.0$, $p < .001$, partial $\eta^2 = .002$, trivial effect size, as a function of student mobility, and as a function of student poverty, Wilks' $\Lambda = .85$, $p < .001$, partial $\eta^2 = .16$, large effect size (Cohen, 1988). Congruent with the previous two years, poverty had a large influence on student achievement. A statistically significant difference was present between the covariate of economic status and TAKS Reading scores, $F(1, 228422) = 33665.56$, $p < .001$, $r = .36$; TAKS Mathematics scores, $F(1, 228422) = 35117.96$, $p < .001$, $r = .37$; and TAKS Writing scores, $F(1, 228422) = 24637.70$, $p < .001$, $r = .31$. After controlling for the effect of economic status, a statistically significant effect of mobility was present for the TAKS reading scores, $F(1, 228422) = 365.21$, $p < .001$, partial $\eta^2 = .002$; TAKS Mathematics scores, $F(1, 228442) = 470.09$, $p < .001$, partial $\eta^2 = .002$; and for the TAKS Writing scores, $F(1, 228442) = 324.11$, $p < .001$, partial $\eta^2 = .001$.

For research question b for each subject area, the MANOVA revealed a statistically significant difference between mobile and non-mobile Grade 7 students in their overall achievement, Wilks' $\Lambda = 1.0$, $p < .001$, partial $\eta^2 = .004$, trivial effect size (Cohen, 1988). Follow-up ANOVA procedures also yielded statistically significant differences between mobile and non-mobile Grade 7 students in their TAKS Reading performance, $F(1, 228433) = 619.66$, $p < .001$, partial $\eta^2 = .003$; in their TAKS Mathematics performance, $F(1, 228433) = 751.83$, $p < .001$, partial $\eta^2 = .003$; and in their TAKS Writing performance, $F(1, 228433) = 544.87$, $p < .001$, partial $\eta^2 = .002$.

Similar to the two previous years, non-mobile students had higher average TAKS Reading, Mathematics, and Writing test scores in the 2004-2005 school year than their mobile counterparts. These results remained even when controlling for economic status. Cohen's *d* indicated a small effect size for reading (i.e., 0.35), mathematics (i.e., 0.41), and writing (i.e., 0.32; Cohen, 1988). The average TAKS Reading test raw score for mobile students was 2.73 points lower than the average TAKS Reading test raw score for non-mobile students. Concerning the TAKS Mathematics exam, the average raw score for mobile students was 3.84 points lower than the average raw score for non-mobile students. Regarding the TAKS Writing exam, the average raw score for mobile students was 2.18 points lower than the average raw score for non-mobile students. Revealed in Table 3.3 are the descriptive statistics for Grade 7 TAKS Reading, Mathematics, and Writing scores by mobility and economic status for the 2004-2005 school year.

Insert Table 3.3 about here

With respect to research question a for each subject area for the 2005-2006 school year, as noted previously, student economic status was used as a covariate in research questions a for each subject area. For these research questions, a MANCOVA statistical procedure was calculated. A statistically significant difference was yielded on student overall achievement, Wilks' $\Lambda = 1.0$, $p < .001$, partial $\eta^2 = .004$, trivial effect size, as a function of student mobility, and as a function of student poverty, Wilks' $\Lambda = .85$, $p < .001$, partial $\eta^2 = .15$, large effect size (Cohen, 1988). Congruent with the previous three years, poverty had a large influence on student achievement. A statistically significant difference was present between the covariate of economic status and TAKS Reading scores, $F(1, 231671) = 31484.75$, $p < .001$, $r = .35$; TAKS Mathematics scores, $F(1, 231671) = 34300.69$, $p < .001$, $r = .37$; and TAKS Writing scores, $F(1, 231671) = 24004.68$, $p < .001$, $r = .31$. After controlling for the effect of economic status, a statistically significant effect of mobility remained for the TAKS Reading scores, $F(1, 231671) = 604.38$, $p < .001$, partial $\eta^2 = .003$; TAKS Mathematics scores, $F(1, 231671) = 938.95$, $p < .001$, partial $\eta^2 = .004$; and for the TAKS Writing scores, $F(1, 231671) = 494.34$, $p < .001$, partial $\eta^2 = .002$.

For research question b for each subject area, the MANOVA revealed a statistically significant difference between mobile and non-mobile Grade 7 students in their overall achievement, Wilks' $\Lambda = .99$, $p < .001$, partial $\eta^2 = .006$, trivial effect size (Cohen, 1988). Follow-up ANOVA procedures also yielded statistically significant differences between mobile and non-mobile Grade 7 students in their TAKS Reading performance, $F(1, 231671) = 953.01$, $p < .001$, partial $\eta^2 = .004$; in their TAKS

Mathematics performance, $F(1, 231671) = 1347.32$, $p < .001$, partial $\eta^2 = .006$; and in their TAKS Writing performance, $F(1, 231671) = 788.40$, $p < .001$, partial $\eta^2 = .003$.

Similar to the previous three years, non-mobile students had higher average TAKS Reading, Mathematics, and Writing test scores in the 2005-2006 school year than their mobile counterparts. These results remained even when controlling for economic status. Cohen's *d* indicated a small effect size for reading (i.e., 0.42), a moderate effect size for mathematics (i.e., 0.53), and a small effect size for writing (i.e., 0.37; Cohen, 1988). The average TAKS Reading test raw score for mobile students was 3.15 points lower than the average TAKS Reading test raw score for non-mobile students. Regarding the TAKS Mathematics exam, the average raw score for mobile students was 4.91 points lower than the average raw score for non-mobile students. Concerning the TAKS Writing exam, the average raw score for mobile students was 2.39 points lower than the average raw score for non-mobile students. Revealed in Table 3.4 are the descriptive statistics for Grade 7 TAKS Reading, Mathematics, Writing scores by mobility and economic status for the 2005-2006 school year.

Insert Table 3.4 about here

Regarding the 2006-2007 school year, as noted previously, student economic status was used as a covariate in research question a for each subject area. For these research questions, a MANCOVA statistical procedure was calculated. A statistically significant difference was yielded on student overall achievement, Wilks' $\Lambda = 1.0$, $p < .001$, partial $\eta^2 = .004$, trivial effect size, as a function of student mobility, and as a function of student poverty, Wilks' $\Lambda = .86$, $p < .001$, partial $\eta^2 = .14$, large effect size (Cohen, 1988). Congruent with the previous four years, poverty had a large influence on student achievement. A statistically significant difference was present between the covariate of economic status and TAKS Reading scores, $F(1, 228249) = 32922.21$, $p < .001$, $r = .36$; TAKS Mathematics scores, $F(1, 228249) = 26517.71$, $p < .001$, $r = .33$; and TAKS Writing scores, $F(1, 228249) = 24802.06$, $p < .001$, $r = .32$. After controlling for the effect of economic status, a statistically significant effect of mobility was present for the TAKS reading scores, $F(1, 228249) = 452.05$, $p < .001$, partial $\eta^2 = .002$; TAKS Mathematics scores, $F(1, 228249) = 780.83$, $p < .001$, partial $\eta^2 = .003$; and for the TAKS Writing scores, $F(1, 228249) = 453.15$, $p < .001$, partial $\eta^2 = .002$.

For research question b for each subject area, the MANOVA revealed a statistically significant difference between mobile and non-mobile Grade 7 students in their overall achievement, Wilks' $\Lambda = 1.0$, $p < .001$, partial $\eta^2 = .005$, trivial effect size (Cohen, 1988). Follow-up ANOVA procedures also yielded statistically significant differences between mobile and non-mobile Grade 7 students in their TAKS Reading performance, $F(1, 228296) = 713.15$, $p < .001$, partial $\eta^2 = .003$; in their TAKS Mathematics performance, $F(1, 228296) = 1066.43$, $p < .001$, partial $\eta^2 = .005$; and in their TAKS Writing performance, $F(1, 228296) = 688.51$, $p < .001$, partial $\eta^2 = .003$.

Similar to the previous four years, non-mobile students had higher average TAKS Reading, Mathematics, and Writing test scores in the 2006-2007 school year than their mobile counterparts. These results remained even when controlling for economic status. Cohen's *d* indicated a small effect size for reading (i.e., 0.40), a moderate effect size for mathematics (i.e., 0.52), and a small effect size for writing (i.e., 0.39; Cohen, 1988). The average TAKS Reading test raw score for mobile students was 2.91 points lower than the average TAKS Reading test raw score for non-mobile students. Concerning the TAKS Mathematics exam, the average raw score for mobile students was 4.78 points lower than the average raw score for non-mobile students. Regarding the TAKS Writing exam, the average raw score for mobile students was 2.21 points lower than the average raw score for non-mobile students. Delineated in Table 3.5 are the descriptive statistics for Grade 7 TAKS Reading, Mathematics, and Writing scores by mobility and economic status for the 2006-2007 school year.

Insert Table 3.5 about here

With respect to the 2007-2008 school year, as noted previously, student economic status was used as a covariate in research question a for each subject area. For these research questions, a MANCOVA statistical procedure was calculated. A statistically significant difference was yielded on student overall achievement, Wilks' $\Lambda = 1.0$, $p < .001$, partial $\eta^2 = .003$, trivial effect size, as a function of student mobility, and as a function of student poverty, Wilks' $\Lambda = .86$, $p < .001$, partial $\eta^2 = .14$, large effect size (Cohen, 1988). Congruent with the previous five years, poverty had a large influence on student achievement. A statistically significant difference was present between the covariate of economic status and TAKS Reading scores, $F(1, 240910) = 30369.13$, $p < .001$, $r = .34$; TAKS Mathematics scores, $F(1, 240910) = 30812.54$, $p < .001$, $r = .34$; and TAKS Writing scores, $F(1, 240910) = 23568.17$, $p < .001$, $r = .30$. After controlling for the effect of economic status, a statistically significant effect of mobility remained for the

TAKS reading scores, $F(1, 240910) = 412.92$, $p < .001$, partial $\eta^2 = .002$; TAKS Mathematics scores, $F(1, 240910) = 631.03$, $p < .001$, partial $\eta^2 = .003$; and for the TAKS Writing scores, $F(1, 240910) = 362.39$, $p < .001$, partial $\eta^2 = .002$.

For research question b for each subject area, the MANOVA revealed a statistically significant difference between mobile and non-mobile Grade 7 students in their overall achievement, Wilks' $\Lambda = 1.0$, $p < .001$, partial $\eta^2 = .004$, trivial effect size (Cohen, 1988). Follow-up ANOVA procedures also yielded statistically significant differences between mobile and non-mobile Grade 7 students in their TAKS Reading performance, $F(1, 240910) = 646.38$, $p < .001$, partial $\eta^2 = .003$; in their TAKS Mathematics performance, $F(1, 240910) = 898.29$, $p < .001$, partial $\eta^2 = .004$; and in their TAKS Writing performance, $F(1, 240910) = 564.898$, $p < .001$, partial $\eta^2 = .002$.

Similar to the previous five years, non-mobile students had higher average TAKS Reading, Mathematics, and Writing test scores in the 2007-2008 school year than their mobile counterparts. These results remained even when controlling for economic status. Cohen's *d* indicated a small effect size for reading (i.e., 0.40), a moderate effect size for mathematics (i.e., 0.51), and a small effect size for writing (i.e., 0.37; Cohen, 1988). The average TAKS Reading test raw score for mobile students was 3.08 points lower than the average TAKS Reading test raw score for non-mobile students. Concerning the TAKS Mathematics exam, the average raw score for mobile students was 4.82 points lower than the average raw score for non-mobile students. Regarding the TAKS Writing exam, the average raw score for mobile students was 2.11 points lower than the average raw score for non-mobile students. Table 3.6 contains the descriptive statistics for Grade

7 TAKS Reading, Mathematics, and Writing scores by mobility and economic status for the 2007-2008 school year.

Insert Table 3.6 about here

Discussion

The relationship between student mobility and academic achievement for Grade 7 students was examined in this study for the 2002-2003 through the 2007-2008 school years with and without controlling for economic status. Data were obtained from the Texas Education Agency Public Education Information Management System for all Texas Grade 7 students who were in the accountability subset for a school district. Statistically significant results were present in each school year, both when controlling for economic status and when not controlling for economic status. Trends for each subject area test were determined following the statistical analyses.

Across the six school years of statewide data analyzed in this study, non-mobile students had higher average TAKS Reading test scores than mobile students in each school year. The difference in reading scores between non-mobile students and mobile students ranged from 1.93 points to 3.15 points. To evaluate the relative difference between these two groups across the school years, a Cohen's *d* was calculated for each year. These values are delineated in Table 3.7 and range from a high of 0.42 to a low of 0.25. As such, these effect sizes were in the small range (Cohen, 1988).

Insert Table 3.7 about here

Differences between non-mobile and mobile students were not as large for the TAKS Reading assessment as they were for the TAKS Mathematics test. Across the six school years of data analyzed in this study, non-mobile students had higher average TAKS Mathematics raw scores than did mobile students in each school year. Average differences between non-mobile students and mobile students ranged from 2.57 points to 4.79 points. To determine the practical importance of these differences, a Cohen's *d* was calculated for each school year. Table 3.8 contains the values for these Cohen *d*s, which ranged from 0.28 to 0.53. Effect size values at 0.50 or above were moderate whereas the effect sizes below 0.50 were small (Cohen, 1988).

Insert Table 3.8 about here

The smallest differences between mobile and non-mobile students existed in the TAKS Writing scores. Across the six years of data analyzed differences in group means ranged from 1.66 points to 2.42 points. Similar to the TAKS Reading and TAKS Mathematics, non-mobile students had higher scores than mobile students. Cohen's *d*s were calculated for each school year to determine the practical importance of these differences. Cohen's *d* values for this study are presented in Table 3.9 and ranged from 0.24 to 0.39. These values were all reflective of small effect sizes (Cohen, 1988).

Insert Table 3.9 about here

Implications for Policy and Practice

In Texas, schools are held accountable for a particular group of students referred to as their accountability subset. This accountability is realized through school ratings and punitive measures. Students who constitute the accountability subset in Texas are those students who are enrolled in a campus or district on the last Friday in October (i.e., Snapshot Day) and take the state standardized assessment (i.e., formerly the TAKS and now the State of Texas Assessments of Academic Readiness). Mobile students are those students who are enrolled at a campus less than 83% of the school year. Students with the greatest mobility are not included in the school's accountability subset, however some mobile students will be included in that accountability subset.

The definitions of a mobile student and parameters for a school's accountability subset create two subsets of mobile students. The first subset consists of students who are mobile, but are still included in an accountability subset. The second subset is comprised of mobile students who are not included in a school's accountability subset. The parameters for the accountability subset in Texas take in to account research literature regarding the existence of groups of students who are so mobile no single school has an opportunity to have an effect on them (Kerbow, 1995). The parameters of the accountability subset exclude the most mobile students. Over 99% of these students were also excluded from this study as their TAKS scores were not present in the data set. This adjustment appears to be effective in mitigating the effects of the most mobile students on a campus as gauged by the persistence of a difference in the academic achievement of mobile and non-mobile students but small effect sizes. However, excluding these students from the accountability subset creates incentives for not providing academic interventions for these students when scarcity in resources exists (Scherrer, 2013).

Connections with Existing Literature

The statistically significant differences between non-mobile students and mobile students in their reading and mathematics performance in each of the six years of data analyzed herein, when controlling for and not controlling for economic status, are congruent with the research literature that mobility negatively influences academic achievement (e.g., Audette, Algozzine, & Warden, 1993; Hanushek et al., 2004, 2009; Kerbow, 1995; Lovell & Isaacs, 2008; Reynolds et al., 2009; Schaller, 1975; Scherrer, 2013; Smith et al., 2008). Results, including a consideration of students included in this study and excluded due to a lack of scores, are also commensurate with other research finding about student mobility. The exclusion of the most mobile students from the accountability subset may allow the needs of the most mobile students to be neglected and at the same time these students may be in the most need of academic assistance.

As previously discussed, the definition of mobile students in Texas and the accountability subset create different classes of student mobility. Previously, researchers (e.g., Alexander, Entwisle, & Dauber, 1996) have documented that different types of students exhibit different types of mobility. Lower income students tend to move within a district and from low performing school to low performing school whereas more affluent students leave low performing districts for higher performing districts, and, as a result, experience improvements in their academic achievement (Hanushek et al., 2004, 2009). Researchers (e.g., Boroque, 2009; Hanushek et al., 2004, 2009; Hartman, 2003; Reynolds et al., 2009; Smith et al., 2008) have also established that more mobile students (i.e., students who move more frequently) experience greater negative effects of mobility than do students who move less frequently. Unintended consequences of accountability systems can be that students not included in the accountability system do not receive interventions that they need if they are in competition with students who are included in the accountability system (Scherrer, 2013).

Recommendations for Future Research

Represented in Table 3.10 are students who were enrolled in Texas schools during the school years of data analyzed herein. Over 3,000 Grade 7 students per year were excluded from the study because their test scores were not included in the data set. The excluded students were predominantly mobile students.

Insert Table 3.10 about here

Presented in Table 3.11 are the students who were included in the study. In the case of mobile students more students were not included in the study than were the numbers of mobile students. Very few students who were not included in an accountability subset had scores included in the data set utilized for this study.

Insert Table 3.11 about here

Prior academic achievement has also been reported to have an effect on the academic outcomes of mobile students (e.g., Heinlein & Shinn, 2000; Reynolds et al., 2009; Strand & Demie, 2007). Connecting academic achievement for students across moves, years, and possible testing changes is difficult. As improvements in tracking students have occurred a more recent data set may be better able to connect students across moves. Researchers considering students prior academic achievement could contribute to the mobility knowledge base.

Demographic characteristics of students may also have an effect on the academic achievement outcomes for mobile students. Researchers are encouraged to undertake studies in which student gender is analyzed to determine the degree to which differences might be present in the academic achievement of mobile boys and girls. Another variable that needs to be addressed is the relationship of mobility and student ethnicity/race and academic achievement. The degree to which mobility has similar results for Asian, White, Hispanic, and Black students is not known. Finally, it is recommended that researchers investigate the academic achievement of other middle grade level (i.e., Grade 6 and Grade 8) mobile students.

Summary

The relationship between the negative effects of mobility and the negative effects of economic disadvantage have been frequently debated. Measures to mitigate the effects of mobile students on a school's ratings have been implemented in Texas; however these measures also eliminate many of mobile students from this study. In this multiyear, statewide analysis, Grade 7 mobile students had lower academic achievement in reading, mathematics, and writing than their non-mobile counterparts. The greatest differences in performance were attributable to student economic status. However, even when economic status was controlled, mobile students continued to have lower test scores than their non-mobile counterparts. More research is needed in which data at other middle level grades and containing a larger percentage of students not included in an accountability subset are analyzed.

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Table 3.1

Descriptive Statistics for Grade 7 TAKS Reading, Mathematics, and Writing Tests for Mobile and Non-Mobile Students for the 2002-2003 School Year

TAKS Test by Mobility Status	*n*	*M*	*SD*
Reading			
Non-Mobile	212,766	37.17	7.48
Mobile	4,128	35.24	8.03
Mathematics			
Non-Mobile	212,766	29.46	9.38
Mobile	4,128	26.89	8.93
Writing			
Non-Mobile	212,766	30.75	6.65
Mobile	4,128	29.09	7.06

Table 3.2

Descriptive Statistics for Grade 7 TAKS Reading, Mathematics, and Writing Tests for Mobile and Non-Mobile Students for the 2003-2004 School Year

TAKS Test by Mobility Status	*n*	*M*	*SD*
Reading			
Non-Mobile	221,678	38.38	7.64
Mobile	4,505	35.73	8.48
Mathematics			
Non-Mobile	221,678	31.16	9.07
Mobile	4,505	27.49	8.79
Writing			
Non-Mobile	221,678	30.90	6.80
Mobile	4,505	28.48	7.11

Table 3.3

Descriptive Statistics for Grade 7 TAKS Reading, Mathematics, and Writing Tests for Mobile and Non-Mobile Students for the 2004-2005 School Year

TAKS Test by Mobility Status	*n*	*M*	*SD*
Reading			
Non-Mobile	223,867	38.87	7.32
Mobile	4,555	36.41	8.40
Mathematics			
Non-Mobile	223,867	32.16	9.64
Mobile	4,555	28.22	9.66
Writing			
Non-Mobile	223,867	33.08	6.25
Mobile	4,555	30.90	7.18

Table 3.4

Descriptive Statistics for Grade 7 TAKS Reading, Mathematics, and Writing Tests for Mobile and Non-Mobile Students for the 2005-2006 School Year

TAKS Test by Mobility Status	*n*	*M*	*SD*
Reading			
Non-Mobile	226,938	39.39	6.92
Mobile	4,733	36.24	8.20
Mathematics			
Non-Mobile	226,938	33.48	9.11
Mobile	4,733	28.57	9.41
Writing			
Non-Mobile	226,938	34.42	5.79
Mobile	4,733	32.03	6.99

Table 3.5

Descriptive Statistics for Grade 7 TAKS Reading, Mathematics, and Writing Tests for Mobile and Non-Mobile Students for the 2006-2007 School Year

TAKS Test by Mobility Status	*n*	*M*	*SD*
Reading			
Non-Mobile	224,513	38.99	6.59
Mobile	3,736	36.08	7.79
Mathematics			
Non-Mobile	224,513	34.96	8.86
Mobile	3,736	30.18	9.50
Writing			
Non-Mobile	224,513	34.38	5.10
Mobile	3,736	32.17	6.12

Table 3.6

Descriptive Statistics for Grade 7 TAKS Reading, Mathematics, and Writing Tests for Mobile and Non-Mobile Students for the 2007-2008 School Year

TAKS Test by Mobility Status	*n*	*M*	*SD*
Reading			
Non-Mobile	237,642	40.58	6.84
Mobile	3,268	37.50	8.49
Mathematics			
Non-Mobile	237,642	35.32	9.06
Mobile	3,268	30.53	9.76
Writing			
Non-Mobile	237,642	34.26	5.02
Mobile	3,268	32.15	6.20

Table 3.7

Cohen's ds for Grade 7 TAKS Reading Differences Between Mobile and Non-Mobile Students for the 2002-2003 Through the 2007-2008 School Years

School Year	*d*	Effect Size Range	Lowest Performing Group
2002-2003	0.25	Small	Mobile
2003-2004	0.33	Small	Mobile
2004-2005	0.35	Small	Mobile
2005-2006	0.42	Small	Mobile
2006-2007	0.40	Small	Mobile
2007-2008	0.40	Small	Mobile

Table 3.8

Cohen's ds for Grade 7 TAKS Mathematics Differences Between Mobile and Non-Mobile Students for the 2002-2003 Through the 2007-2008 School Years

School Year	*d*	Effect Size Range	Lowest Performing Group
2002-2003	0.28	Small	Mobile
2003-2004	0.41	Small	Mobile
2004-2005	0.41	Small	Mobile
2005-2006	0.53	Moderate	Mobile
2006-2007	0.52	Moderate	Mobile
2007-2008	0.51	Moderate	Mobile

Table 3.9

Cohen's ds for Grade 7 TAKS Writing Differences Between Mobile and Non-Mobile Students for the 2002-2003 Through the 2007-2008 School Years

School Year	*d*	Effect Size Range	Lowest Performing Group
2002-2003	0.24	Small	Mobile
2003-2004	0.35	Small	Mobile
2004-2005	0.32	Small	Mobile
2005-2006	0.37	Small	Mobile
2006-2007	0.39	Small	Mobile
2007-2008	0.37	Small	Mobile

Table 3.10

Sample Group Sizes for Grade 7 Not Included Students

Year	Total Cases in Data Set	Not Included			
		Mobile		Not-Mobile	
		Accountability Subset	Non Accountability Subset	Accountability Subset	Non Accountability Subset
2003	297,292	4,551	14,261	61,108	477
2004	307,871	3,627	13,924	63,502	635
2005	310,928	4,528	13,937	63,688	342
2006	312,137	4,670	15,132	60,269	395
2007	306,237	4,065	13,436	60,125	315
2008	335,041	4,241	15,218	74,349	323

Table 3.11

Sample Group Sizes for Grade 7 Included Students

Year	Total Cases In Data Set	Included			
		Mobile		Not-Mobile	
		Accountability Subset	Non Accountability Subset	Accountability Subset	Non Accountability Subset
2003	297,292	4,101	28	212,762	4
2004	307,871	2,794	68	223,321	0
2005	310,928	4,527	38	223,865	3
2006	312,137	4,683	50	226,935	3
2007	306,237	3,705	31	224,559	1
2008	335,041	3,196	72	237,642	0

CHAPTER IV

MOBILITY AND DIFFERENCES IN READING, MATHEMATICS, AND SCIENCE ACHIEVEMENT IN TEXAS FOR GRADE 8 STUDENTS

This dissertation follows the style and format of *Research in the Schools (RITS)*.

Abstract

Differences in reading, mathematics, and science achievement of Grade 8 students as a function of mobility were examined with and without controls for economic status in this investigation. Data were obtained from the Texas Education Agency Public Education Information Management System for the 2003-2004 through the 2007-2008 school years. Statistically significant differences were revealed in reading, mathematics, and science test scores as a function of student mobility, both when controlling for and not controlling for economic status. Mobile students had statistically significantly lower reading and mathematics test scores than did non-mobile students for all 6 school years. Science scores were statistically significantly lower for all three years for which data were available. Implications for policy and practice and suggestions for future research were made.

Keywords: Mobility, academic achievement, poverty, Grade 8, Texas

MOBILITY AND DIFFERENCES IN READING, MATHEMATICS, AND SCIENCE ACHIEVEMENT IN TEXAS FOR GRADE 8 STUDENTS

Grade 8 has been the point of transition between high schools and primary schools in the United States since the beginning of urban public education. Encouraged through reform movements during the late 1800s and 1900s, school systems were transitioned to provide students the more rigorous course work of high school earlier. These developments coupled with overcrowding and reforms requiring or encouraging more students to obtain a high school education provoked the creation of Grade 7 to Grade 9 junior high schools. From the 1960s through the 1990s middle school grade configurations (i.e., Grade 6 to Grade 8 or Grade 6 to Grade 9) replaced junior high schools (Clark, Slate, Combs, & Moore, 2014). During the 2013-2014 school year, 379,597 students were enrolled in Grade 8 in Texas. During the same school year, over 67% of campuses serving Grade 8 students ended with Grade 8 (Texas Education Agency, 2014). The predominance of Grade 8 as a gateway grade to high school makes understanding influences on Grade 8 students' academic achievement a high priority.

Student Effects of Mobility

Mobility has been indicated as at least a contributing factor to negative academic outcomes (Kerbow, 1995; Lee & Smith, 1999; Rhodes, 2007; Rumberger, Larson, Ream, & Plardy, 1999; Smith, Smith, & Byrk, 1998). Mobile students constantly entering and leaving classrooms have been reported to reduce the pace of the curriculum. These curricular pacing issues, if not addressed, can create difficulties both for mobile and non-mobile students (Rumberger et al., 1999; Thompson, Meyers, & Oshima, 2011). Researchers analyzing the effects of mobility on students have also linked mobility to negative behavior (e.g., Fomby & Senott, 2013; Haynie, South, & Bose, 2006; Simpson & Fowler, 1994) and poor school persistence (e.g., Rumberger & Larson, 1998; South, Haynie, & Bose, 2007). Mobile students also participate in extracurricular activities at a lower rate, according to Scherrer (2013), which has been shown to increase academic achievement, reduce negative behavior, and increase connections to school.

Differential effects of mobility have been documented depending on other characteristics of students. Mobile students with high academic achievement exhibit reduced achievement; however, students who are able to become involved in extra-curricular activities do not experience the decrease in achievement. Students with poor academic achievement at the school they are leaving often see similar results at their new school. Average students tend to experience the greatest reduction in performance when entering a new school (Langenkamp, 2011). It is also possible that the cause of mobility creates differences in student outcomes (Hanushek, Kain, & Rivkin, 2004, 2009).

Causes and Prevalence of Mobility

Families in the United States move for a variety of reasons (Ream, 2005; Rumberger, 2003). In Texas during the 2012-2013 school year, over 875,000 students were classified as mobile by Texas Education Agency's (2014) definition (i.e., attended a particular school for less than 83% of the school year). This number includes residential mobility, school encouraged mobility, and parent/student choice mobility. In the United States, Rumberger, (2003) reported that 58% of student mobility is due to residential mobility and 10% is due to school encouraged moves (e.g., expulsion, or placement at an alternative school). Whether the cause is parent and student choice, school encouraged, or residential, mobility is related to negative school outcomes (Gruman, Harachi, Abbott, Catalano, & Fleming, 2008; Rumberger, 2003).

Mobility to seek out a better school is a type of parent or student choice caused mobility. However, Hanushek et al. (2004, 2009) illustrated that school improvement only occurred when changing districts. School choice not combined with a residence change is regularly only allowed within a district. School encouraged moves, generally associated with poor behavior, may be initiated with the intention of eliminating problems, but may have negative long term effects (Fomby & Sennott, 2013). Residential mobility sometimes is able to be delayed and sometimes not able to be delayed. In situations where mobility is unavoidable some schools have instituted policies and procedures to mitigate the negative effects of mobility. Other schools have instituted programs to discourage mobility (Rumberger; 2003) in some ways extending homeless students supports to mobile students. Both approaches to solutions for mobility have been shown to be successful.

Solutions for Mobility

Residential mobility that is unavoidable is a regular occurrence in the military community. The Department of Defense Education Activity, which administers schools on military bases, has developed several programs designed to alleviate the known negative effects of mobility (Smearkar & Owens, 2003). School districts in areas where mobility is also common have also instituted similar programs, as well as programs to discourage mobility when possible (Franke, Isken, & Para, 2003). Policies and programs can and have been implemented to assist populations known to experience high mobility (Branz-Spall, Rosenthal, & Wright, 2003; Rhodes, 2007).

The Department of Defense Education Activity administers schools on U.S. military bases around the world. As military connected families are transferred from base to base, often their children are subjected to unavoidable residential mobility mid-school year (Smearkar & Owens, 2003). As a result of this frequent mobility, these schools have adapted several best practices for mitigating the negative effects of student mobility. Schools on all military bases maintain an aligned curriculum so that students transferring midyear do not experience any larger gaps than necessary (Smearkar & Owens, 2003). Records transfer is expedited to ensure students can be immediately placed in appropriate programs. This student information is also shared with off base schools in the area where military connected families may also reside. Department of Defense Education Activity schools maintain a small size and experienced staff to meet students' needs more appropriately. Students already attending the schools are also used as ambassadors to incoming students to assist in social acclimation at the new school (Smearkar & Owens, 2003; Summers & Moehnke, 2006).

Where military mobility is unavoidable, other residential mobility may be either avoidable or possibly delayed until summer break. Schools where student mobility has been identified as an issue have instituted programs to inform parents of the negative effects of mid-school year mobility (Franke et al., 2003). Programs providing access to medical services, summer nutrition, and summer activities foster a greater connection to schools. Families who feel a stronger connection to their school are more likely to avoid a move if possible (Franke et al., 2003). School districts with identified mobility issues have implemented policies allowing students to attend the school they began the year in even if a residential change has occurred that would otherwise require a school change.

Some districts have included transportation provisions in their policies to increase the attractiveness of staying at one school for an entire year despite a residence change (James & Lopez, 2003).

Federal and state policies have been implemented to assist mobile students as well. The McKinney-Vento Homeless Education Improvements Assistance Act of 2001 requires schools to allow students experiencing homelessness to remain in the school they began the school year in, or attend a school even if they do not have permanent residence within that school's established attendance zone (Julianelle & Foscarinis, 2003; Pavlakas, 2014). Federal programs have also provided funds for technology to assist migrant students in receiving a continuous educational experience during their mobility (Branz-Spall et al., 2003).

Purpose of the Study

The purpose of this study was to investigate the connection between student mobility (i.e., enrollment in a particular school less than 83% of the school year) and academic achievement (i.e., Texas Assessment of Knowledge and Skills raw scores) for Grade 8 students in Texas while controlling for economic status. Economic status was measured by eligibility for the federal free and reduced lunch program. Six years of Texas statewide data were analyzed for reading and mathematics and three years of data were analyzed for science to ascertain the degree to which trends might be present in student performance.

Significance of the Study

Researchers (e.g., Heinlein & Shinn, 2000; Kain & O'Brien, 1998) who have considered the effects of mobility have not generated a clear consensus on the effects of mobility when controlling for other variables. The differences in the outcomes of research efforts are contributed to by difficulty in obtaining samples large enough to produce statistical significance or data sources rich enough to include information regarding confounding variables. Data utilized in this study were obtained from the Texas Education Agency Public Education Information Management System. This data source contained information for all students who took the Texas Assessment of Knowledge and Skills Reading, Mathematics, and Science tests in Grade 8 in Texas from school year 2002-2003 to school year 2007-2008. Data regarding student economic status were also available through this data source.

Statement of the Problem

Mobility is measured in different ways throughout the research base. The lack of consistency in defining mobility along with the difficulty of tracking mobile students outside of a local education agency contributes to lack of consensus on the effects of mobility. Consistently, however, mobility is linked to negative school outcomes (Haynie et al., 2006; Kerbow, 1995; Rumberger, 2003; Simpson & Fowler, 1994). For the purposes of this study, the definition of mobility by the Texas Education Agency (2012) was used: a student's enrollment in one school for less than 83% of the school year. Negative school outcomes, regardless of the definition used, may have been related to inconsistency in curriculum between the sending and receiving school (Smith, Fein, & Paine, 2008). Students selecting new peer groups contribute to negative social behaviors after a move (Haynie et al., 2006). Changing schools could have also caused difficulty for students creating connections to their new school (Kerbow, Azcoita, & Buell, 2003).

These various difficulties may have either been the cause or effect of mobility. Researchers (e.g., Heinlein & Shinn, 2000) who have undertaken studies regarding mobility have often utilized sample sizes that are not adequate to identify confounding variables and large enough to produce statistical significance. Data collected for this study provided a sufficiently large sample size such that the issues of power and confounding variables (i.e., prior academic achievement, and economic status) were addressed.

Research Questions

The research questions addressed in this study were organized according to the three subjects assessed in Texas at Grade 8. The research questions concerning reading were: (a) What is the relationship of student mobility to Grade 8 reading achievement when controlling for economic status?; and (b) What is the relationship of student mobility to Grade 8 reading achievement when not controlling for economic status? Research questions regarding mathematics were: (a) What is the relationship of student mobility to Grade 8 mathematics achievement when controlling for economic status?; and (b) What is the relationship of student mobility to Grade 8 mathematics achievement when not controlling for economic status? Research questions involving science were: (a) What is the relationship of student mobility to Grade 8 science achievement when controlling for economic status?; and (b) What is the relationship of student mobility to Grade 8 science achievement when not controlling for economic status? These research questions were repeated for each school year of data analyzed.

Method

Research Design

A non-experimental research design (Johnson & Christensen, 2008) was used for this study because of the use of archival data. The independent variable, mobility, had already occurred; therefore random group assignment was not possible. The independent variable of mobility as defined by the Texas Education Agency (i.e., enrollment in a particular school for less than 83% of the school year) was used as a control variable for three dependent variables in this study. The dependent variables in this study were represented by three measures of academic achievement (i.e., reading, mathematics, and science) assessed in Grade 8 in Texas. Achievement levels in each of these areas were measured by the raw score on the respective Grade 8 subject area subtest of the Texas Assessment of Knowledge and Skills. Student economic status, measured by eligibility for the federal free and reduced lunch program, was utilized as a control variable.

Participants and Instrumentation

In this study data from the Texas Education Agency Public Education Information Management System were analyzed to investigate differences in the academic achievement of mobile and non-mobile students in Grade 8 in Texas. All students who took the Texas Assessment of Knowledge and Skills Reading, or Mathematics test in Grade 8 in school years 2002-2003 to 2007-2008 and students who took the Science assessment in Grade 8 in the 2005-2006 school year, Grade 8 in the 2006-2007 school year, Grade 8 in the 2007-2008 school year were included in this study. These groups of students included over 300,000 students for each school year.

Raw scores for the Grade 8 Texas Assessment of Knowledge and Skills tests administered in 2003, 2004, 2005, 2006, 2007, and 2008 were utilized as the dependent variables. Readers can review specific score validity and score reliability data in the specific technical manuals available through a Public Information Request to the Texas Education Agency.

Data Analysis

Research questions in which economic status (i.e., the a research question) were controlled for were analyzed using Multivariate Analysis of Covariance (MANCOVA) statistical procedures. Prior to conducting any MANCOVA procedures, its underlying assumptions of data normality and homogeneity of covariance were determined. An underlying assumption of homogeneity of regression slopes also had to be checked prior to considering the MANCOVA analysis.

Research questions in which economic status (i.e., the b research question) were not controlled for were analyzed using a Multivariate Analysis of Variance (MANOVA) statistical procedure. A MANOVA procedure was used due to the multiple dependent variables associated with a single independent variable. The MANOVA procedure has similar underlying assumptions to the MANCOVA procedures. Even if these assumptions were not met, MANOVA procedures are robust enough to provide useful data (Field, 2009).

Results

Results of the statistical analysis for Grade 8 mobile and non-mobile students will be reported by TAKS subject area subtest (i.e., Reading, Mathematics, and Science in years available). Results of each test will be reported in chronological order. Research question a for each subject area required a MANCOVA procedure to consider economic status as a covariate and are reported first. Research question b for each subject area required a MANOVA procedure and are discussed second. Data from the TAKS Reading and Mathematics tests for the 2002-2003 through the 2007-2008 school years and the TAKS Science test for the 2005-2006 to 2007-2008 school years were analyzed.

As noted previously, student economic status was used as a covariate in research question a for each subject area. For these research questions, a MANCOVA statistical procedure was calculated for the 2002-2003 school year. A statistically significant difference was yielded on student overall achievement, Wilks' $\Lambda = 1.0$, $p < .001$, partial $\eta^2 = .002$, trivial effect size, as a function of student mobility, and as a function of student poverty, Wilks' $\Lambda = .86$, $p < .001$, partial $\eta^2 = .14$, large effect size (Cohen, 1988). Readers should note the strong influence of poverty on student achievement in this analysis. A statistically significant difference was present between the covariate of economic status and TAKS Reading scores, $F(1, 217514) = 2608.54$, $p < .001$, $r = .33$; and between the covariate of economic status and TAKS Mathematics scores, $F(1, 217514) = 29944.78$, $p < .001$, $r = .35$. After controlling for the effect of economic status, a statistically significant effect of mobility was present for the TAKS Reading scores, $F(1, 217514) = 308.01$, $p < .001$, partial $\eta^2 = .001$ and TAKS Mathematics scores, $F(1, 217514) = 355.64$, $p < .001$, partial $\eta^2 = .002$.

The MANOVA completed for research question b for each subject area revealed a statistically significant difference between mobile and non-mobile Grade 7 students in their overall achievement, Wilks' $\Lambda = 1.0$, $p < .001$, partial $\eta^2 = .003$, trivial effect size (Cohen, 1988). Follow-up Analysis of Variance (ANOVA) procedures also yielded statistically significant differences between mobile and non-mobile Grade 8 students in their TAKS Reading performance, $F(1, 218067) = 494.63$, $p < .001$, partial $\eta^2 = .002$ and in their TAKS Mathematics performance, $F(1, 218067) = 563.02$, $p < .001$, partial $\eta^2 = .003$.

Non-mobile students had higher average TAKS Reading and Mathematics test scores in the 2002-2003 school year than their mobile counterparts. These results remained even when controlling for economic status. Cohen's *d* indicated a small effect size for both reading (i.e., 0.31) and mathematics (i.e., 0.35; Cohen, 1988). The average TAKS Reading test raw score for mobile students was 2.55 points lower than the average TAKS Reading test raw score for non-mobile students. With respect to the TAKS Mathematics exam, the average raw score for mobile students was 3.23 points lower than the average raw score for non-mobile students. Delineated in Table 4.1 are the descriptive statistics for Grade 7 TAKS Reading, and Mathematics scores by mobility and economic status for the 2002-2003 school year.

Insert Table 4.1 about here

As noted previously, student economic status was used as a covariate in research question a for each subject area for the 2003-2004 school year. For these research questions, a MANCOVA statistical procedure was calculated. A statistically significant difference was yielded on student overall achievement, Wilks' $\Lambda = 1.0$, $p < .001$, partial $\eta^2 = .003$, trivial effect size, as a function of student mobility, and as a function of student poverty, Wilks' $\Lambda = .86$, $p < .001$, partial $\eta^2 = .14$, large effect size (Cohen, 1988).

Similar to the previous year, poverty had a large influence on student achievement. A statistically significant difference was present between the covariate of economic status and TAKS Reading scores, $F(1, 227868) = 29078.16$, $p < .001$, $r = .34$; and TAKS Mathematics scores, $F(1, 227868) = 31168.64$, $p < .001$, $r = .35$. After controlling for the effect of economic status, a statistically significant effect of mobility was still present for TAKS Reading scores, $F(1,227868) = 477.67$, $p < .001$, partial $\eta^2 = .002$ and for TAKS Mathematics scores, $F(1, 227868) = 741.80$, $p < .001$, partial $\eta^2 = .003$.

With respect to research question b for each subject area, the MANOVA revealed a statistically significant difference between mobile and non-mobile Grade 8 students in their overall achievement, Wilks' $\Lambda = 1.0$, $p < .001$, partial $\eta^2 = .005$, trivial effect size (Cohen, 1988). Follow-up ANOVA procedures also yielded statistically significant differences between mobile and non-mobile Grade 8 students in their TAKS Reading performance, $F(1, 227875) = 838.28$, $p < .001$, partial $\eta^2 = .004$ and in their TAKS Mathematics performance, $F(1, 227875) = 1169.33$, $p < .001$, partial $\eta^2 = .005$.

Similar to the previous year, non-mobile students had higher average TAKS Reading and Mathematics test scores in 2004 than their mobile counterparts. These results remained even when controlling for economic status. Cohen's *d* indicated a small effect size for both reading (i.e., 0.38) and mathematics (i.e., 0.49; Cohen, 1988). The average TAKS Reading test raw score for mobile students was 2.69 points lower than the average TAKS Reading test raw score for non-mobile students. Regarding the TAKS Mathematics exam, the average raw score for mobile students was 4.84 points lower than the average raw score for non-mobile students. Delineated in Table 4.2 are the descriptive statistics for Grade 8 TAKS Reading and Mathematics scores by mobility and economic status for the 2003-2004 school year.

Insert Table 4.2 about here

Concerning the 2004-2005 school year, student economic status was used as a covariate in research questions a for each subject area. For these research questions, a MANCOVA statistical procedure was calculated. A statistically significant difference was yielded on student overall achievement, Wilks' $\Lambda = 1.0$, $p < .001$, partial $\eta^2 = .004$, trivial effect size, as a function of student mobility, and as a function of student poverty, Wilks' $\Lambda = .86$, $p < .001$, partial $\eta^2 = .14$, large effect size (Cohen, 1988). Congruent with the previous two years, poverty had a large influence on student achievement. A statistically significant difference was present between the covariate of economic status and TAKS Reading scores, $F(1, 231858) = 297030.58$, $p < .001$, $r = .34$; and for TAKS Mathematics scores, $F(1, 231858) = 31237.98$, $p < .001$, $r = .35$. After controlling for the effect of economic status, a statistically significant effect of mobility was present for the TAKS reading scores, $F(1, 231858) = 704.44$, $p < .001$, partial $\eta^2 = .003$ and for TAKS Mathematics scores, $F(1, 231858) = 785.42$, $p < .001$, partial $\eta^2 = .003$.

For research question b for each subject area, the MANOVA revealed a statistically significant difference between mobile and non-mobile Grade 8 students in their overall achievement, Wilks' $\Lambda = 0.99$, $p < .001$, partial $\eta^2 = .006$, trivial effect size (Cohen, 1988).. Follow-up ANOVA procedures also yielded statistically significant differences between mobile and non-mobile Grade 8 students in their TAKS Reading performance, $F(1, 231982) = 1052.44$, $p < .001$, partial $\eta^2 = .005$ and in their TAKS Mathematics performance, $F(1, 231982) = 1149.79$, $p < .001$, partial $\eta^2 = .005$.

Similar to the two previous years, non-mobile students had higher average TAKS Reading and Mathematics test scores in the 2004-2005 school year than their mobile counterparts. These results remained even when controlling for economic status. Cohen's *d* indicated a small effect size for both reading (i.e., 0.40) and mathematics (i.e., 0.48; Cohen, 1988). The average TAKS Reading test raw score for mobile students was 3.45 points lower than the average TAKS Reading test raw score for non-mobile students. Concerning the TAKS Mathematics exam, the average raw score for mobile students was 4.72 points lower than the average raw score for non-mobile students. Revealed in Table 4.3 are the descriptive statistics for Grade 8 TAKS Reading and Mathematics scores by mobility and economic status for the 2004-2005 school year.

Insert Table 4.3 about here

With respect to research question a for each subject area for the 2005-2006 school year, as noted previously, student economic status was used as a covariate in research questions a for each subject area. For these research questions, a MANCOVA statistical procedure was calculated. A statistically significant difference was yielded on student overall achievement, Wilks' $\Lambda = 0.99$, $p < .001$, partial $\eta^2 = .006$, trivial effect size, as a function of student mobility, and as a function of student poverty, Wilks' $\Lambda = .83$, $p < .001$, partial $\eta^2 = .17$, large effect size (Cohen, 1988). Congruent with the previous three years, poverty had a large influence on student achievement. A statistically significant difference was present between the covariate of economic status and TAKS Reading scores, $F(1, 234319) = 30150.94$, $p < .001$, $r = .34$; TAKS Mathematics scores, $F(1, 234319) = 29978.00$, $p < .001$, $r = .35$; and TAKS Science scores, $F(1, 234319) = 45825.16$, $p < .001$, $r = .41$. After controlling for the effect of economic status, a statistically significant effect of mobility remained for the TAKS Reading scores, $F(1, 234319) = 842.44$, $p < .001$, partial $\eta^2 = .004$; TAKS Mathematics scores, $F(1, 234319) = 1275.42$, $p < .001$, partial $\eta^2 = .005$; and for the TAKS Science scores, $F(1, 234319) = 978.98$, $p < .001$, partial $\eta^2 = .004$.

For research question b for each subject area, the MANOVA revealed a statistically significant difference between mobile and non-mobile Grade 8 students in their overall achievement, Wilks' $\Lambda = .99$, $p < .001$, partial $\eta^2 = .008$, trivial effect size (Cohen, 1988). Follow-up ANOVA procedures also yielded statistically significant differences between mobile and non-mobile Grade 8 students in their TAKS Reading performance, $F(1, 234325) = 1266.28$, $p < .001$, partial $\eta^2 = .005$; in their TAKS Mathematics performance, $F(1, 234325) = 1760.66$, $p < .001$, partial $\eta^2 = .007$; and in their TAKS Science performance, $F(1, 234325) = 1486.38$, $p < .001$, partial $\eta^2 = .006$.

Similar to the previous three years, non-mobile students had higher average TAKS Reading and Mathematics scores, and also TAKS Science test scores in the 2005-2006 school year than their mobile counterparts. These results remained even when controlling for economic status. Cohen's *d* indicated a small effect size for reading (i.e., 0.44) and a moderate effect size for mathematics (i.e., 0.68) and science (i.e., 0.54; Cohen, 1988). The average TAKS Reading test raw score for mobile students was 3.69 points lower than the average TAKS Reading test raw score for non-mobile students.

Regarding the TAKS Mathematics exam, the average raw score for mobile students was 5.63 points lower than the average raw score for non-mobile students. Concerning the TAKS Science exam, the average raw score for mobile students was 5.02 points lower than the average raw score for non-mobile students. Revealed in Table 4.4 are the descriptive statistics for Grade 8 TAKS Reading, Mathematics, Science scores by mobility and economic status for the 2005-2006 school year.

Insert Table 4.4 about here

Regarding the 2006-2007 school year, as noted previously, student economic status was used as a covariate in research question a for each subject area. For these research questions, a MANCOVA statistical procedure was calculated. A statistically significant difference was yielded on student overall achievement, Wilks' $\Lambda = 1.0$, $p < .001$, partial $\eta^2 = .005$, trivial effect size, as a function of student mobility, and as a function of student poverty, Wilks' $\Lambda = .84$, $p < .001$, partial $\eta^2 = .17$, large effect size (Cohen, 1988). Congruent with the previous four years, poverty had a large influence on student achievement. A statistically significant difference was present between the covariate of economic status and TAKS Reading scores, $F(1, 237335) = 26235.44$, $p < .001$, $r = .32$; TAKS Mathematics scores, $F(1, 237335) = 28061.39$, $p < .001$, $r = .33$; and TAKS Science scores, $F(1, 237335) = 45999.49$, $p < .001$, $r = .41$. After controlling for the effect of economic status, a statistically significant effect of mobility was present for the TAKS Reading scores, $F(1, 237355) = 555.82$, $p < .001$, partial $\eta^2 = .002$; TAKS Mathematics scores, F(1, 237355 = 1149.29, $p < .001$, partial $\eta^2 = .005$; and TAKS

Science scores, $F(1, 237335) = 893.47$, $p < .001$, partial $\eta^2 = .004$.

For research question b for each subject area, the MANOVA revealed a statistically significant difference between mobile and non-mobile Grade 8 students in their overall achievement, Wilks' $\Lambda = 0.99$, $p < .001$, partial $\eta^2 = .007$, trivial effect size. Follow-up ANOVA procedures also yielded statistically significant differences between mobile and non-mobile Grade 8 students in their TAKS Reading performance, $F(1, 237408) = 854.11$, $p < .001$, partial $\eta^2 = .004$; in their TAKS Mathematics performance, $F(1, 237408) = 1532.79$, $p < .001$, partial $\eta^2 = .006$; and in their TAKS Science performance, $F(1, 237408) = 1302.04$, $p < .001$, partial $\eta^2 = .005$.

Similar to the previous four years, non-mobile students had higher average TAKS Reading and Mathematics test scores, and the previous year Science test scores in the 2006-2007 school year than their mobile counterparts. These results remained even when controlling for economic status. Cohen's *d* indicated a small effect size for reading (i.e., 0.39) and a moderate effect size for mathematics (i.e., 0.58) and science (i.e., 0.54; Cohen, 1988). The average TAKS Reading test raw score for mobile students was 2.8 points lower than the average TAKS Reading test raw score for non-mobile students. Concerning the TAKS Mathematics exam, the average raw score for mobile students was 5.35 points lower than the average raw score for non-mobile students. Regarding the TAKS Science exam, the average raw score for mobile students was 4.83 points lower than the average raw score for non-mobile students. Delineated in Table 4.5 are the descriptive statistics for Grade 8 TAKS Reading, Mathematics, and Science scores by mobility and economic status for the 2006-2007 school year.

Insert Table 4.5 about here

With respect to the 2007-2008 school year, as noted previously, student economic status was used as a covariate in research question a for each subject area. For these research questions, a MANCOVA statistical procedure was calculated. A statistically significant difference was yielded on student overall achievement, Wilks' $\Lambda = 1.0$, $p < .001$, partial $\eta^2 = .005$, trivial effect size, as a function of student mobility, and as a function of student poverty, Wilks' $\Lambda = .86$, $p < .001$, partial $\eta^2 = .14$, large effect size (Cohen, 1988). Congruent with the previous five years, poverty had a large influence on student achievement. A statistically significant difference was present between the covariate of economic status and TAKS Reading scores, $F(1, 237406) = 26527.78$, $p < .001$, $r = .34$; TAKS Mathematics scores, $F(1, 237406) = 43519.34$, $p < .001$, $r = .34$; and TAKS Science scores, $F(1, 237406) = 43519.34$, $p < .001$, $r = .30$. After controlling for the effect of economic status, a statistically significant effect of mobility remained for the TAKS reading scores, $F(1, 237406) = 658.31$, $p < .001$, partial $\eta^2 = .003$; TAKS Mathematics scores, $F(1, 237406) = 1033.14$, $p < .001$, partial $\eta^2 = .004$; and for the TAKS Science scores, $F(1, 237406) = 954.64$, $p < .001$, partial $\eta^2 = .004$.

For research question b for each subject area, the MANOVA revealed a statistically significant difference between mobile and non-mobile Grade 8 students in their overall achievement, Wilks' $\Lambda = 1.0$, $p < .001$, partial $\eta^2 = .005$, trivial effect size (Cohen, 1988). Follow-up ANOVA procedures also yielded statistically significant differences between mobile and non-mobile Grade 8 students in their TAKS Reading performance, $F(1, 237406) = 737.036$, $p < .001$, partial $\eta^2 = .003$; in their TAKS Mathematics performance, $F(1, 237406) = 1128.06$, $p < .001$, partial $\eta^2 = .005$; and in their TAKS Science performance, $F(1, 237406) = 1053.31$, $p < .001$, partial $\eta^2 = .004$.

Similar to the previous five years, non-mobile students had higher average TAKS Reading, Mathematics, and Science test scores in the 2007-2008 school year than their mobile counterparts. These results remained even when controlling for economic status. Cohen's *d* indicated a small effect size for reading (i.e., 0.39) and a moderate effect size for mathematics (i.e., 0.53) and science (i.e., 0.51; Cohen, 1988). The average TAKS Reading test raw score for mobile students was 2.43 points lower than the average TAKS Reading test raw score for non-mobile students. Concerning the TAKS Mathematics exam, the average raw score for mobile students was 4.85 points lower than the average raw score for non-mobile students. Regarding the TAKS Science exam, the average raw score for mobile students was 4.65 points lower than the average raw score for non-mobile students. Table 4.6 contains the descriptive statistics for Grade 8 TAKS Reading, Mathematics, and Science scores by mobility and economic status for the 2007-2008 school year.

Insert Table 4.6 about here

Discussion

The relationship between mobility and academic achievement in reading, mathematics, and science was considered for Grade 8 students both with and without controlling for student economic status. Data from the 2002-2003 to 2007-2008 were analyzed for reading and mathematics achievement and data from the 2005-2006 to 2007-2008 school years were analyzed for science achievement. All data were obtained from the Texas Education Agency Public Education Information Management System for all Texas Grade 8 students who were in an accountability subset for a campus or district. Statistically significant results were present for each school year and subject considered both when controlling for economic status and not controlling for economic status. Trends for each subject area were determined following the statistical analysis.

Non-mobile students had higher average performance on TAKS Reading than mobile students in all school years analyzed herein. Average reading scores differed between the two groups by as much as 15.84 points and as little as 2.43 points. Cohen's *d* was calculated for each year to evaluate the relative difference between the two groups across school years. These values are delineated in Table 4.7 and range from a high of 0.93 to a low of 0.31. As such these effect sizes were in the small to large range. Effect sizes below 0.50 were small, effect sizes between 0.51 and 0.79 were moderate, and the effect size values at 0.80 or above were large (Cohen, 1988).

Insert Table 4.7 about here

Differences in the mobile and non-mobile groups' average scores were larger for the TAKS Mathematics test. Non-mobile students had a higher average performance on the TAKS Mathematics test than mobile students in each school year. Average mathematics scores differed between the two groups by as much as 14.47 points and as little as 4.85 points. Cohen's *d* was calculated for each year to evaluate the relative difference between the two groups across school years. These values are delineated in Table 4.8 and range from a high of 0.97 to a low of 0.35. As such these effect sizes were in the small to large range. Effect sizes below 0.50 were small, effect sizes between 0.50 and 0.79 were moderate, and the effect size values at 0.80 or above were large (Cohen, 1988).

Insert Table 4.8 about here

Differences in the mobile and non-mobile groups' average scores were larger for the TAKS Science test than the TAKS Mathematics test but larger than the TAKS Reading test. Non-mobile students had higher average performance on the TAKS Science test than mobile students in each school year. Average science scores differed between the two groups by as much as 11.81 points and as little as 4.65 points. Cohen's *d* was calculated for each year to evaluate the relative difference between the two groups across school years. These values are delineated in Table 4.9 and range from a high of 0.92 to a low of 0.54. As such these effect sizes were in the moderate to large range. Effect sizes below 0.80 were moderate whereas the effect size values at 0.80 or above were large (Cohen, 1988).

Insert Table 4.9 about here

Implications for Policy and Practice

Campus and district accountability in Texas is determined based on the accountability subset. To be included in this group of students a student must be enrolled at a campus on the last Friday in October (i.e., Snapshot Day) and take the state standardized test (i.e., formerly the TAKS and now the State of Texas Assessment of Academic Readiness) on the same campus (Texas Education Agency, 2012). These parameters prevent the most mobile students from negatively influencing the campus accountability; however the most mobile students are also missing from this data set. Therefore a campus and district accountability set may include some mobile students but not the most mobile students.

The parameters of the accountability subset and the definition of a mobile student according to the Texas Education Agency (2012) definition create two subsets of mobile students. The first subset are those students who are mobile and included in an accountability subset, and the second is students who are mobile and not included in the accountability subset. In this separation of mobile students protects schools from the negative effects of mobility while excluding the most mobile students from the schools accountability. The presence of a statistically significant difference between mobile and non-mobile students but with small effect sizes when considering a data set that includes very few students not in an accountability subset indicates that Texas measures to protect schools from the negative effects of mobility have been successful. Numbers of students included in this study and included in an accountability subset or not is delineated in Table 4.10. However, the unintended consequences of accountability systems (Scherrer, 2013) may be that the most mobile students are excluded from needed interventions.

Insert Table 4.10 about here

Connections with Existing Literature

The existing literature supports the results of this study indicating mobile students exhibit lower academic achievement than non-mobile students when controlling for and not controlling for economic status (e.g., Boroque, 2009; Bruno & Isken, 1996; Kerbow, 1995; Lovell & Isaacs, 2008; Reynolds, Chen, & Herbers, 2009; Scherrer, 2013). Conclusions in this study that the most mobile students are often excluded from data sets are congruent with previously produced research. Previous conclusions that the most mobile students are excluded from accountability subsets and therefore may be excluded from needed interventions have also been supported by this study.

The definition of mobility and the parameters of accountability subsets in Texas have created different classes of student mobility. Previous researchers (e.g., Scherrer, 2013) have also concluded that not all mobile students exhibit the same effects of mobility. Students who experience more mobility experience greater negative effects. Scarce resources require school officials to provide the most interventions for students who they will be held accountable for (Scherrer, 2013).

Recommendations for Future Research

Represented in Table 4.11 are students who were enrolled in Texas schools during the years of data analyzed in this study who were not included in the study due to missing scores. Mobile students were most frequently excluded from the study and were most frequently not included in accountability subsets. Research on students not included in accountability subsets would provide needed insight into the relationship between mobility and academic achievement.

Research considering prior academic achievement of mobile students would also be a valuable addition to the knowledge base. Improvements in tracking students across moves and years could have led to improvements in the data set. A more recent data set may be able to provide this added control variable. Other control variables such as gender and ethnicity could also be quality additions to the research base. Finally, research investigations into other middle grade levels (i.e., Grade 6 and Grade 7) would contribute to an understanding of the prevalence of negative effects of mobility.

Summary

The effect of mobility on students' academic achievement and the relationship between mobility and economic disadvantage has been frequently debated. Texas has implemented measures to reduce the negative effects of mobile students on schools accountability. However, these measures have also removed many students most in need of assistance from schools accountability. In this multiyear, empirical investigation, most Grade 8 students excluded from the accountability subsets were not part of the statistical analyses. Of the subset of Grade 8 mobile students who were part of this study, they had lower academic achievement in reading, mathematics, and science than did their non-mobile peers. In all analyses, economic status had the strongest influence on Grade 8 student academic achievement. After controlling for the effects of poverty, however, mobility itself continued to have a statistically significant effect on Grade 8 student academic achievement.

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Table 4.1

Descriptive Statistics for Grade 8 TAKS Reading and Mathematics Tests for Mobile and Non-Mobile Students for the 2002-2003 School Year

TAKS Test by Mobility Status	*n*	*M*	*SD*
Reading			
Non-Mobile	213,425	39.14	7.70
Mobile	4,642	36.59	8.92
Mathematics			
Non-Mobile	213,425	30.95	9.18
Mobile	4,642	27.72	9.04

Table 4.2

Descriptive Statistics for Grade 8 TAKS Reading and Mathematics Tests for Mobile and Non-Mobile Students for the 2003-2004 School Year

TAKS Test by Mobility Status	*n*	*M*	*SD*
Reading			
Non-Mobile	222,885	39.80	6.46
Mobile	4,983	37.11	7.71
Mathematics			
Non-Mobile	222,885	33.10	9.90
Mobile	4,983	28.26	9.81

Table 4.3

Descriptive Statistics for Grade 8 TAKS Reading and Mathematics Tests for Mobile and Non-Mobile Students for the 2004-2005 School Year

TAKS Test by Mobility Status	*n*	*M*	*SD*
Reading			
Non-Mobile	226,767	40.71	7.50
Mobile	5,091	37.26	9.46
Mathematics			
Non-Mobile	226,767	33.02	9.86
Mobile	5,091	28.30	10.09

Table 4.4

Descriptive Statistics for Grade 8 TAKS Reading, Mathematics, and Science Tests for Mobile and Non-Mobile Students for the 2005-2006 School Year

TAKS Test by Mobility Status	*n*	*M*	*SD*
Reading			
Non-Mobile	229,190	40.65	7.31
Mobile	5,129	36.96	9.17
Mathematics			
Non-Mobile	229,190	33.02	9.86
Mobile	5,129	28.30	10.09
Science			
Non-Mobile	229,190	33.02	9.22
Mobile	5,129	28.00	9.46

Table 4.5

Descriptive Statistics for Grade 8 TAKS Reading, Mathematics, and Science Tests for Mobile and Non-Mobile Students for the 2006-2007 School Year

TAKS Test by Mobility Status	*n*	*M*	*SD*
Reading			
Non-Mobile	232,872	41.09	6.30
Mobile	4,463	38.29	7.84
Mathematics			
Non-Mobile	232,872	35.62	9.06
Mobile	4,463	30.27	9.31
Science			
Non-Mobile	232,872	33.92	8.86
Mobile	4,463	29.09	9.07

Table 4.6

Descriptive Statistics for Grade 8 TAKS Reading, Mathematics, and Science Tests for Mobile and Non-Mobile Students for the 2007-2008 School Year

TAKS Test by Mobility Status	*n*	*M*	*SD*
Reading			
Non-Mobile	233,633	42.56	5.43
Mobile	3,773	40.13	6.95
Mathematics			
Non-Mobile	233,633	37.17	8.79
Mobile	3,773	32.32	9.60
Science			
Non-Mobile	233,633	36.46	8.72
Mobile	3,773	31.81	9.38

Table 4.7

Cohen's ds for Grade 8 TAKS Reading Differences Between Mobile and Non-Mobile Students for the 2002-2003 Through the 2007-2008 School Years

School Year	*d*	Effect Size Range	Lowest Performing Group
2002-2003	0.31	Small	Mobile
2003-2004	0.38	Small	Mobile
2004-2005	0.40	Small	Mobile
2005-2006	0.44	Small	Mobile
2006-2007	0.39	Small	Mobile
2007-2008	0.39	Small	Mobile

Table 4.8

Cohen's ds for Grade 8 TAKS Mathematics Differences Between Mobile and Non-Mobile Students for the 2002-2003 Through the 2007-2008 School Years

School Year	*d*	Effect Size Range	Lowest Performing Group
2002-2003	0.35	Small	Mobile
2003-2004	0.49	Small	Mobile
2004-2005	0.48	Small	Mobile
2005-2006	0.68	Moderate	Mobile
2006-2007	0.58	Moderate	Mobile
2007-2008	0.53	Moderate	Mobile

Table 4.9

Cohen's ds for Grade 8 TAKS Science Differences Between Mobile and Non-Mobile Students for the 2005-2006 Through the 2007-2008 School Years

School Year	*d*	Effect Size Range	Lowest Performing Group
2005-2006	0.54	Moderate	Mobile
2006-2007	0.54	Moderate	Mobile
2007-2008	0.51	Moderate	Mobile

Table 4.10

Sample Group Sizes for Grade 8 Included Students

Year	Total Cases In Data Set	Included			
		Mobile		Not-Mobile	
		Accountability Subset	Non Accountability Subset	Accountability Subset	Non Accountability Subset
2003	304,906	4,507	135	213,409	16
2004	315,542	4,899	86	222,880	10
2005	320,637	4,968	132	226,876	6
2006	327,993	4,998	136	229,178	13
2007	331,203	4,379	91	232,931	7
2008	336,287	3,732	41	233,630	3

Table 4.11

Sample Group Sizes for Grade 8 Not Included Students

Year	Total Cases in Data Set	Not Included			
		Mobile		Not-Mobile	
		Accountability Subset	Non Accountability Subset	Accountability Subset	Non Accountability Subset
2003	304,906	3,441	14,232	68,673	493
2004	315,542	3,472	14,072	69,699	424
2005	320,637	3,585	14,457	70,192	421
2006	327,993	3,831	15,942	73,466	429
2007	331,203	3,486	15,298	74,620	391
2008	336,287	4,456	22,276	71,475	674

CHAPTER V

DISCUSSION

Mobility and economic status are closely related (Rumberger, 2003) and as such debate persist regarding attribution of the negative effects on academic achievements to either factor. Mobile students are more likely to be economically disadvantaged (Hartman, 2003) which leads to the intermingling of the two issues. Economic disadvantage can lead to mobility through negative factors such as job change, eviction, (Hartman, 2003) and family separation (Lee & Burkam, 1992). These factors individually can lead to decreases in academic achievement without leading to mobility, however when they lead to mobility the stresses are compounded.

Connection with Theoretical Framework

Mobility, independent of stress factors associated with economic disadvantage, can create stressors that lead to reduced academic achievement. Families new to an area have reduced connections to and understanding of local support systems. Social capital theorists state these connections can be utilized to overcome gaps in curriculum or obtain needed academic intervention services (Marandos & Randal, 2012; Parcel & Pennell, 2012). School connectedness theorists indicate mobile students have less connection to new schools which can lead to reduced persistence and participation in activities expected to lead to higher academic achievement (Langenkamp, 2011). Unintended consequences of accountability systems theorists indicated schools are less likely to provide finite interventions for students for whom they are not held accountable through accountability systems that eliminate the most mobile students (Scherrer, 2013). As such, results obtained in the three empirical investigations in this journal-ready dissertation were congruent with these three theoretical frameworks.

Discussion of Results

In the three studies included in this dissertation data from students in Grade 6, 7, and 8 were analyzed for reading, mathematics, writing, and science achievement where these subjects are tested in these grades. Relationships between mobility and academic achievement were considered both controlling for economic status and not controlling for economic status. Data from the 2002-2003 through the 2007-2008 school years were analyzed. Results at each grade level, for each subject area, for each year analyzed were consistent. Mobility had a statistically significant negative effect on academic achievement, albeit with small effect sizes. Economic disadvantage, in all analyses, had a very large effect on student academic achievement. When controlling for economic status, mobility continued to have a statistically significant effect on student academic achievement.

Considering the sample of students whose scores were available for analysis, the Texas definition of mobility (i.e., enrollment for 83% of the school year or greater) and the Texas parameters for the students whose school would be held accountable for (i.e., their accountability subset) eliminated many of the most mobile students from inclusion in this study. Policy and research regarding both the included and excluded students should be considered.

Implications for Policy and Practice

The parameters in Texas for mobility and accountability subsets acknowledge the research indicating mobile students' negative influence on academic achievement. The negative effect of mobility on academic achievement appears to be somewhat mitigated by these definitions. Readers should note, however, that the negative influence of mobility still persists. Accordingly, interventions are needed to improve the academic achievement of these mobile students. Practices to increase school connectedness and social capital are valuable tools to for students experiencing mobility. Some school officials in schools where mobility is most prevalent (e.g., Department of Defense Education Activity schools) have instituted many of these practices that can be used as guidance for schools looking to reduce the effect of mobility on students (Smrekar & Owens, 2003). Other school policy decisions, often involving transportation can reduce mobility (James & Lopez, 2003). Federal legislation considerations have also been made through the McKinney-Vento Homeless Education Act (Pavlakas, 2014) that should continue to be supported.

Suggestions for Further Research

The data sets considered in this study included only a small portion of students whose mobility excludes them from accountability subsets. These students typically will have higher mobility rates and the negative effects may be more pronounced in these students requiring even greater interventions. Researchers should investigate data sets inclusive of these students. Improvements in tracking students across moves and years and testing changes may make a newer data set better suited for investigating the group of students excluded from accountability subsets.

Researchers should also consider the effect mobility may have on different ethnic/racial groups (i.e., Asian, Black, Hispanic, or White). Mobility may also affect boys and girls differently, and therefore researchers could consider the effect of mobility on gender. Prior researchers (e.g., Reynolds et al., 2009) have indicated previous academic achievement may explain the effects of mobility on students. Researchers with access to a data set better able to connect students across years and moves could control for prior academic achievement. Research has also been conducted in which evidence that the effects of mobility disappear after as little as a year of non-mobility has been obtained (Gruman et al., 2008). Researchers with access to a more complete data set could also examine this assertion.

Conclusion

The purpose of this journal-ready dissertation was to examine the relationship of mobility to the academic achievement of middle school students when controlling for economic status. After obtaining and analyzing six years of statewide data across three grade levels and four subject areas statistically significant differences were revealed in the academic achievement of mobile students and non-mobile students when controlling for and not controlling for economic status. In all of the data analyzed between the 2002-2003 and the 2007-2008 school years, the average TAKS Reading, Mathematics, Writing, and Science scores were statistically significantly lower for mobile students than for non-mobile students. These differences were present both when economic status was controlled for and when it was not controlled for in the statistical analyses.

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APPENDIX

Institutional Review Board
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Sam Houston
STATE UNIVERSITY
A Member of The Texas State University System

DATE:	September 24, 2015
TO:	Benjamin Bostick [Faculty Sponsor: Dr. John Slate]
FROM:	Sam Houston State University (SHSU) IRB
PROJECT TITLE:	Mobility and Student Achievement in Texas: A Multiyear, Statewide Investigation [T/D]
PROTOCOL #:	2015-09-26345
SUBMISSION TYPE:	INITIAL REVIEW
ACTION:	DETERMINATION OF EXEMPT STATUS
DECISION DATE:	September 24, 2015
REVIEW CATEGORY:	Category 4—research involving existing, publicly available data usually has little, if any, associated risk, particularly if subject identifiers are removed from the data or specimens.

Thank you for your submission of Initial Review materials for this project. The Sam Houston State University (SHSU) IRB has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations.

We will retain a copy of this correspondence within our records.

*** What should investigators do when considering changes to an exempt study that could make it nonexempt?**

It is the PI's responsibility to consult with the IRB whenever questions arise about whether planned changes to an exempt study might make that study nonexempt human subjects research. In this case, please make available sufficient information to the IRB so it can make a correct determination.

If you have any questions, please contact the IRB Office at 936-294-4875 or irb@shsu.edu. Please include your project title and protocol number in all correspondence with this committee.

Sincerely,

Donna Desforges
IRB Chair, PHSC
PHSC-IRB

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Sam Houston State University IRB's records

VITA

Benjamin Mark Bostick

EDUCATIONAL HISTORY

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Teacher, Stovall Middle School, Aldine ISD, January 2004-July 2007
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